



LUND UNIVERSITY

Transition Governance for Sustainable Urban Freight Systems

Exploring Small and Medium-Sized Cities

Kervall, Mikael

2026

Document Version:

Publisher's PDF, also known as Version of record

[Link to publication](#)

Citation for published version (APA):

Kervall, M. (2026). *Transition Governance for Sustainable Urban Freight Systems: Exploring Small and Medium-Sized Cities*. [Doctoral Thesis (compilation), Department of Design Sciences]. Department of Design Sciences, Faculty of Engineering, Lund University.

Total number of authors:

1

General rights

Unless other specific re-use rights are stated the following general rights apply:

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

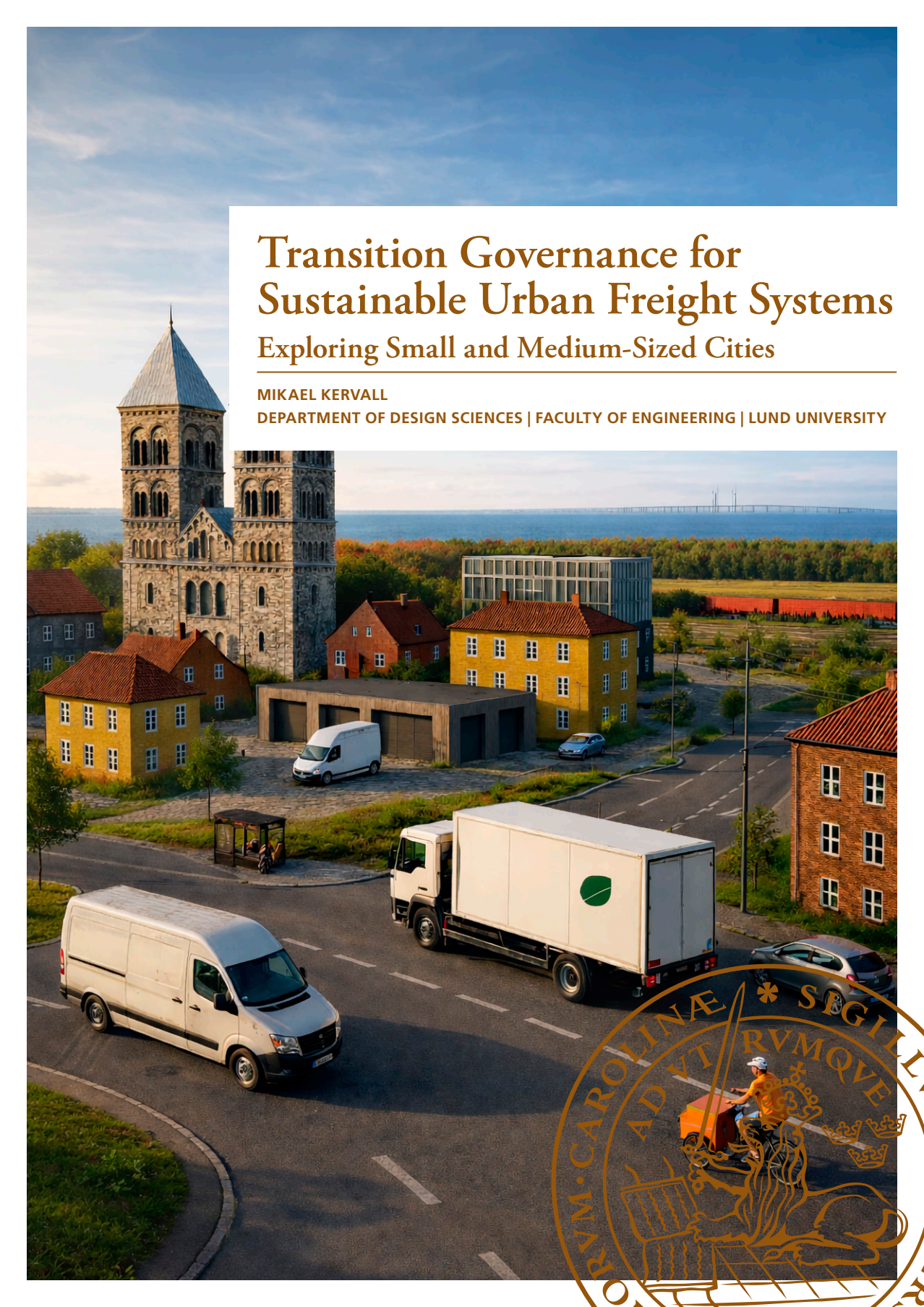
Read more about Creative commons licenses: <https://creativecommons.org/licenses/>

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00



Transition Governance for Sustainable Urban Freight Systems

Exploring Small and Medium-Sized Cities

MIKAEL KERVALL

DEPARTMENT OF DESIGN SCIENCES | FACULTY OF ENGINEERING | LUND UNIVERSITY





Transition Governance for Sustainable Urban Freight Systems: Exploring Small and Medium-Sized Cities

Transition Governance for Sustainable Urban Freight Systems

Exploring Small and Medium-Sized Cities

Mikael Kervall



LUND
UNIVERSITY

DOCTORAL DISSERTATION

Doctoral dissertation for the degree of Doctor of Philosophy (PhD) at the Faculty of Design Sciences, Lund University, to be publicly defended on 17 April 2026 at 09:15 in Stora Hörsalen, Ingvar Kamprad Designcentrum, Klas Anshelms väg 20, Lund

Faculty opponent
Lauri Ojala

Professor of Logistics, Turku School of Economics, University of Turku, Finland

Organization: LUND UNIVERSITY

Document name: Doctoral dissertation

Date of issue: 2026-03-24

Author(s): Mikael Kervall

Sponsoring organization:

Title and subtitle: Transition Governance for Sustainable Urban Freight Systems: Exploring Small and Medium-Sized Cities

Abstract:

Urban freight systems play an indispensable role in contemporary cities. By enabling the continuous flow of goods, they support economic activity and contribute to urban prosperity. At the same time, these activities generate substantial negative externalities, including emissions, noise, congestion and increasing pressures on urban space. As freight activities grow, their impacts intensify, underscoring the need to understand how urban freight systems can be transitioned toward sustainability. Urban freight systems are complex socio-technical systems embedded in broader societal contexts. Transitions of such systems are characterized by long-term, multi-actor processes involving the co-evolution of interdependent factors. These processes challenge established practices, vested interests and structures, while simultaneously requiring actors to align with a normative direction of development. Existing knowledge about transitions in urban freight remains fragmented, with limited understanding of how system dimensions, governance arrangements and contextual factors interact in shaping transitions. This thesis addresses these gaps by exploring how transitions in urban freight systems are affected by different factors, such as city organizations' governance, with a particular focus on small and medium-sized cities, an understudied but important context.

The thesis is based on four studies, three qualitative case studies of small and medium-sized cities and one systematic literature review. Together, these studies explore barriers to transitions, how city administrations in small and medium-sized cities govern their urban freight systems from a transition perspective and how city administrations' resources and governance activities affect their capability to govern these transitions.

The research develops a socio-technical transition lens for urban freight systems, synthesizes and reconceptualizes previously isolated barriers to change as interconnected stabilizing factors within a complex system, and generates new empirical insights into the transition governance in small and medium-sized cities. The thesis provides frameworks that enable practitioners to analyze gaps and build strategies for governance. It also highlights the importance of multi-level and cross-border coordination, as essential in providing supportive transition conditions that individual cities cannot generate alone. Overall, this thesis advances the understanding of urban freight systems transitions toward sustainability and their governance.

Key words: urban freight systems, sustainability transitions, transition governance, small and medium-sized cities, urban logistics, socio-technical systems

Language: English

Number of pages: 66

ISBN: 978-91-8104-890-2 (print)

ISBN: 978-91-8104-891-9 (electronic)

I, the undersigned, being the copyright owner of the abstract of the above-mentioned dissertation, hereby grant to all reference sources permission to publish and disseminate the abstract of the above-mentioned dissertation.

Signature

Date 2026-03-24

Transition Governance for Sustainable Urban Freight Systems

Exploring Small and Medium-Sized Cities

Mikael Kervall



LUND
UNIVERSITY

Copyright

Pages 1-66 © 2026 Mikael Kervall, <https://orcid.org/0000-0001-8783-9789>

Paper 1 © 2022 The authors. Published by MDPI (licensed under [CC BY 4.0](#)).

Paper 2 © 2022 The authors. Published by SpringerOpen (licensed under [CC BY 4.0](#)).

Paper 3 © 2026 The authors. (Manuscript unpublished).

Paper 4 © 2025 The authors. Published by Elsevier (licensed under [CC BY 4.0](#)).

Cover image: AI-generated by the author. © 2026 Mikael Kervall

Published by:

Department of Design Sciences

Faculty of Engineering

Lund University

Lund 2026

ISBN: 978-91-8104-890-2 (print)

ISBN: 978-91-8104-891-9 (electronic)

Printed in Sweden by Media-Tryck, Lund University,
Lund, 2026



Media-Tryck is a Nordic Swan Ecolabel
certified provider of printed material.
Read more about our environmental
work at www.mediatryck.lu.se

MADE IN SWEDEN 

To the amazing planet Earth

Table of Contents

List of figures	10
List of tables	10
Populärvetenskaplig sammanfattning	12
Acknowledgments	15
List of publications and author contributions	16
Introduction	18
Background	18
Research problem	20
Research perspective	20
City size	20
Barriers to development	21
Governance challenges	21
Research aim	22
Purpose and research questions	22
Research focus and delimitations	22
Reading guidance	23
Frame of reference	24
Urban freight systems	24
Stakeholders	26
Barriers to development in urban freight	26
Governing the direction of development	27
Strategic management	29
Transition governance	30
A multi-level perspective on socio-technical transitions	30
Transition management	32
Research methodology	33
Research approach	33
Philosophy of science	33
Systems approach	34

Research design.....	34
Reflections on the research design	36
Research process	37
Research quality	39
Results.....	41
Paper 1	42
Paper 2.....	42
Paper 3.....	43
Paper 4.....	45
Discussion	47
Transitioning urban freight systems	47
Barriers to urban freight transitions.....	48
Governance in small and medium-sized cities	49
Impact of resources and activities on transition capability	50
Conclusions	52
Key findings	52
Understanding barriers as stabilizing factors.....	52
Gaps in current governance practices.....	53
Resource constraints limit transition capability.....	53
Multi-level and cross-border coordination is essential.....	53
Contributions and implications	53
Theoretical contributions.....	54
Practical contributions	54
Policy implications	55
Limitations	56
Geographical and contextual scope	56
Framework construction and theoretical choices	56
Temporal and comparative scope	57
Future research	57
References	59

List of figures

Figure 1. Conceptual representation of the urban freight system and factors affecting its development.	25
Figure 2. A multi-level perspective on socio-technical transitions, adapted from Kervall (2023).	30
Figure 3. Chronological overview of the research process, including the studies and key outputs.	37
Figure 4. The relationship between barriers, as proposed in Paper 2 (Kervall & Pålsson, 2022).	43
Figure 5. The urban freight system from a transition perspective, adapted from Paper 3.	44
Figure 6. The integrated framework for the analysis of transition governance (Kervall et al., 2026).	45

List of tables

Table 1. The four studies behind the thesis.	36
Table 2. Papers, purposes and insights of studies.	41

Populärvetenskaplig sammanfattning

Föreställ dig en vanlig vardag i en stad. Varor levereras till butiker och restauranger, mat körs till skolor och äldreboenden, byggmaterial transporteras till nya stadsdelar och restprodukter och varor av andra slag fraktas bort. Allt detta sker genom ett omfattande nät av transporter med lastbilar, skåpbilar och andra fordon som rör sig på stadens gator i ett stadsnära så kallat urbant fraktsystem. Utan dessa transporter skulle stadens funktioner snabbt stanna av. Samtidigt som de är avgörande för stadens funktion skapar frakttransporter buller, utsläpp och trängsel som påverkar både miljön och människors vardag negativt. Då efterfrågan på frakttransporter väntas öka kraftigt de kommande decennierna, i takt med ökad befolkning, ekonomisk aktivitet och e-handel, blir frågan om hur urban frakt kan göras mer hållbar allt viktigare.

Den här avhandlingen undersöker varför städers fraktsystem är svåra att förändra, och vilka möjligheter städer faktiskt har att påverka utvecklingen i en mer hållbar riktning. Genom intervjuer med tjänstepersoner, fallstudier i flera svenska små och medelstora städer och en systematisk genomgång av tidigare forskning kartläggs både de hinder som bromsar utvecklingen och hur städer arbetar med att styra dessa system. Analysen bygger på teori från områden som strategisk ledning, urban logistik och forskning om samhällsomställning.

Ett urbant fraktsystem är komplext med många aktörer med olika mål, drivkrafter och prioriteringar som möts i systemet. Transportbolag, butiker, industrier, fastighetsägare, lokal politik och olika delar av den offentliga förvaltningen agerar alla utifrån sina egna förutsättningar. Resultatet blir ett system som i praktiken är stabilt men också relativt trögrörigt. Bristande samarbete mellan aktörer, begränsad kunskap om hur fraktsystemet fungerar och osäkra utvecklingsförutsättningar gör det i olika aspekter svårt att ta större steg i utvecklingen mot mer hållbara system. Aktörer tvekar kring att investera i nya lösningar när förutsättningarna är osäkra och konsekvenserna svåra att överblicka. Därför riskerar fraktsystemen att endast utvecklas i små steg, trots att behovet av förändring är stort.

Städers egna organisationer kan ta en central roll i hur fraktsystem utvecklas. De kan sätta mål, skapa planeringsförutsättningar, samla aktörer och initiera förändringsprocesser. Städernas förmåga att driva detta arbete påverkas av resurstillgång och systematik i arbetet. Den här forskningen visar att små och medelstora svenska städer i praktiken ofta inte arbetar systematiskt med att utveckla

den stadsnära frakten i hållbar riktning. Städernas organisationer har små och fragmenterade resurser för strategisk utveckling av fraktområdet. Trots ambitiösa klimatvisioner och mål på stadsnivå finns i ett flertal fall inte strukturer och aktiviteter för att driva utveckling av urban frakt i linje med de övergripande målen om genomgripande omställning mot hållbara städer.

I stället riskerar insatserna att begränsas till mindre pilotprojekt eller tekniska tester som kan vara värdefulla i sig, men otillräckliga för att uppnå storskalig förändring. Strategier, konkreta mål och rutiner för att följa upp utvecklingen över tid saknas ofta. Därmed blir det också svårt att justera åtgärder längs vägen för att maximera effekterna av dem och att koppla samman kortsiktiga initiativ med en långsiktig omställning av systemet.

Den här avhandlingen utvecklar ett nytt perspektiv på omställningen av urbana fraktsystem som visar hur bland annat tekniska, organisatoriska, politiska och omvärldsfaktorer tillsammans formar både hinder och möjligheter. Genom att integrera tidigare fragmenterad kunskap om hinder med insikter om strategisk ledning och samhällsomställning i ett sammanhängande ramverk synliggörs hur olika faktorer samverkar. Hinder mot omställning i urbana fraktsystem är med detta perspektiv också ett uttryck för att komplexa samhällssystem stabiliseras av samverkande faktorer. Det innebär att hinder kan behöva hanteras i en viss ordning för att en omställningsprocess ska bli effektiv. Detta perspektiv synliggör även hur urbana fraktsystem interagerar med det omgivande samhället och med utvecklingen inom olika nischer relaterade till urban frakt såsom leveransboxar och elektriska fordon.

Det analytiska ramverk som utvecklas i avhandlingen hjälper därför städer att:

- se fraktsystemet i ett bredare samhälls- och styrningsperspektiv
- identifiera vilka faktorer som håller systemet stabilt
- prioritera åtgärder så att faktorer som hindrar omställning hanteras i en effektiv ordning
- se hur kortsiktiga projekt kan bli verktyg för att nå långsiktiga mål

Forskningen visar generellt att storskalig hållbar omställning av samhällssystem som de urbana fraktsystemen kräver tydliga mål, uppbyggnad av kunskap, samverkan mellan berörda och en långsiktig styrning som sträcker sig bortom enskilda projekt. Hållbar utveckling av urbana fraktsystem kräver därför att städer systematiskt arbetar med att driva utvecklingen mot hållbar urban frakt och avsätter resurser för detta. För små och medelstora städer framstår detta som särskilt utmanande.

Samarbete blir ur flera aspekter avgörande i denna typ av arbete. Genom att samverka med andra städer samt med regionala och nationella aktörer kan små och

medelstora städer skapa bättre förutsättningar för förändring genom att till exempel skapa ett större förändringstryck på marknaden. När krav och utvecklingsinriktning harmoniseras över större områden, ökar chanserna att aktörer i fraktsystemet vågar investera i nya arbetssätt och delta i mer omfattande omställningar.

Den här forskningen erbjuder ett praktiskt användbart teoretiskt ramverk som kan hjälpa tjänstepersoner och politiker att förstå och styra utvecklingen av urbana fraktsystem. Den visar varför omställningen är svår, vilka mekanismer som bromsar utvecklingen och hur städer kan arbeta strategiskt och systematiskt för komma förbi dessa hinder och skapa en långsiktigt hållbar utvecklingsriktning för sina urbana fraktsystem. Det handlar inte bara om nya tekniska lösningar utan om en helhet kring hur aktörer samspelar, hur beslut fattas och hur systemets stabilitet kan utmanas på ett konstruktivt sätt.

Urban frakt är inte bara en logistisk fråga utan en del av stadens långsiktiga utveckling. Genom att systematiskt kombinera kunskap, stärkt samverkan både mellan lokala intressenter och mellan städer, samt en långsiktig politisk vilja kan städer skapa förutsättningar för att fraktsystemen utvecklas i linje med hållbarhetsmålen och därigenom bidra till mer attraktiva och framtidsanpassade stadsmiljöer.

Acknowledgments

When I began my PhD journey more than six years ago, I could not have imagined the path that lay ahead. Although I had considered pursuing a PhD at various points over the past 15–20 years, I neither understood how different it would be from my previous positions nor anticipated the external circumstances that would shape this period of my life. The Covid-19 pandemic, along with several family-related events, demanded both attention and energy and profoundly influenced the process in ways I could not have foreseen.

This journey would not have been possible without the support of my colleagues at Packaging Logistics and the Department of Design Sciences. I am especially grateful to Professor Henrik Pålsson, with whom I have collaborated closely throughout these years. Together, we have developed ideas into studies and co-authored the articles that form the foundation of this thesis. I am deeply impressed by your dedication to supervision and by the consistently high-quality feedback you have provided on countless drafts and emerging ideas. Your commitment and patience have been invaluable.

I also wish to extend my sincere gratitude to my colleagues and fellow PhD students at the department. Your support, everyday discussions, and, of course our “fikas”, have made this journey both enriching and enjoyable. Your encouragement has mattered more than you may realize.

Finally, I want to express my deepest thanks to my whole family, who supported this journey in countless ways, especially Maria, Elise, and Isak. Choosing to pursue a PhD at this stage in life was not an easy decision, and doing so without your unwavering support would have been far more difficult. Your understanding, motivation, and belief in me have meant everything. You have reminded me of the values worth striving for and inspired me to work toward a more sustainable world. This thesis is as much yours as it is mine.

List of publications and author contributions

The research presented in this thesis is based on four papers. Each of these papers is summarized in Chapter 4, and the full papers are appended.

Paper 1

KERVALL, M. & PÅLSSON, H. (2023). A Multi-Stakeholder Perspective on Barriers to a Fossil-Free Urban Freight System. *Sustainability*, 15(1), 186. <https://doi.org/10.3390/su15010186>

As the lead author, Mikael Kervall collected, analyzed, and synthesized the data and wrote most of the text. Henrik Pålsson provided experienced guidance throughout the process, on methodology and analysis. He also critically reviewed texts. The first version of this study was presented at the 32nd NOFOMA conference online in 2020.

Paper 2

KERVALL, M. & PÅLSSON, H. (2022). Barriers to change in urban freight systems: a systematic literature review. *European Transport Research Review*, 14(29). <https://doi.org/10.1186/s12544-022-00553-2>

As the lead author, Mikael Kervall collected, analyzed, and synthesized the data and wrote most of the text. Henrik Pålsson provided experienced guidance throughout the study and critically reviewed the texts after the paper was drafted.

Paper 3

KERVALL, M. & PÅLSSON, H. (2026). A transition-oriented analytical framework for urban freight: Conceptual development and case study evaluation. [Manuscript submitted]

As the lead author, Mikael Kervall collected, analyzed, and synthesized the data. He also explored and compiled theoretical frameworks and wrote the text. Henrik Pålsson provided guidance on methodology, gave constructive advice, and critically reviewed the texts. A first version of this study was presented at the 34th NOFOMA conference in Reykjavik, Iceland, in 2022.

Paper 4

KERVALL, M., PÅLSSON, H., KAHN, J. (2026). Sustainable urban freight transition governance in small and medium-sized cities. *Transport Policy*, 176. <https://doi.org/10.1016/j.tranpol.2025.103906>

As the lead author, Mikael Kervall coordinated the project, collected, analyzed, and synthesized the data, and wrote most of the text. Henrik Pålsson and Jamil Khan provided guidance on methodology, gave constructive advice, and critically reviewed the texts. Early results from this study were presented at the 10th International Workshop on Sustainable Road Freight in Cambridge, UK, in 2023.

Introduction

This introductory chapter establishes the foundation for this research by presenting the research problem and its underlying background. It further delineates the research purpose, focus, and delimitations. Finally, it provides an outline of the thesis's subsequent chapters to guide the reader.

Background

Urban freight systems are essential to the functioning of contemporary cities. By enabling the continuous flow of goods, they support economic activity and contribute to urban prosperity (Haarstad et al., 2024). At the same time, the activities that sustain urban life also generate significant negative externalities, including emissions, noise, congestion and pressures on urban space (European Commission, 2025; Behrends et al., 2008). As these systems continue to grow in cities around the world, their impacts become more pronounced, making it increasingly important to understand how urban freight can be developed toward sustainability. This tension between the benefits provided by urban freight and the challenges it creates forms the backdrop for this thesis.

According to the International Transport Forum (2021), global demand for urban freight, measured in ton-kilometers, is projected to at least double by 2050 compared to 2015. This is due to factors such as growing economies, urbanization, and e-commerce (International Transport Forum, 2023; Humphreys & Dumitrescu, 2021; Cui et al., 2015). Such growth would currently be problematic due to the negative side effects of urban freight, which erode societal value. Urban freight emits about 13% of freight CO₂ emissions globally and 6% of transport-related CO₂ emissions (Humphreys & Dumitrescu, 2021). In the European Union (EU), it is the main source of air pollution in cities (European Environment Agency, 2023; European Commission, 2025). Additionally, urban freight contributes to congestion, which incurs significant costs (European Commission, 2023). Urban freight, therefore, must transition toward sustainability globally and across different aspects (Humphreys & Dumitrescu, 2021). One goal of the recent European Green Deal is to achieve a competitive, resource-efficient economy with net-zero greenhouse gas emissions by 2050 (European Commission, 2024a). To meet this goal, urban areas

of all sizes, including their freight systems, must evolve beyond incremental improvements and instead transition toward sustainability.

Transitions are multidimensional structural changes (Holtz et al., 2018). Governing, as defined in this thesis as setting conditions that affect and steer, can be difficult in the context of urban freight systems transitioning toward sustainability. Sustainable urban freight systems should, according to (Behrends et al., 2008), successfully combine accessibility to freight transport, externalities below harmful levels to humans and nature, resource, energy, and cost efficiency, even when externalities are included. Urban freight systems, however, have a multitude of stakeholders with different and sometimes conflicting agendas, which also affect system development (Taniguchi & Thompson, 2015; Paddeu et al., 2024). Additionally, the systems are affected by different governing bodies (Ballantyne et al., 2013; Hansson et al., 2023). This makes it difficult to steer the development of these complex systems (Cui et al., 2015; Browne et al., 2024).

A city administration, the bureaucratic part of a city organization, is one of the stakeholders in the city's urban freight system. Bjørgen and Ryghaug (2022) and Lindholm and Behrends (2012) together describe its unique position with multiple roles and entities interrelating with the system and its closeness to political power. In the Swedish context, municipalities also hold a legally mandated and exclusive authority over land-use planning through comprehensive and detailed plans (Landsbygds- och infrastrukturdepartementet, 2010). This arrangement provides cities with a powerful tool to influence the spatial configuration of urban freight systems, including the infrastructure critical to their functioning. A city administration, as a local authority, focuses on maximizing the city's attractiveness (Katsela & Pålsson, 2019; Taniguchi & Thompson, 2015). It does this by balancing environmental, social, and economic interests, while companies tend to prioritize profitability and customer satisfaction. The unique properties of city administrations can be used to affect the development of the urban freight system (Lindholm & Browne, 2013; Schliwa et al., 2015; Taniguchi & Thompson, 2015).

These properties make it relevant for researchers to understand how city administrations govern their urban freight systems and how these systems affect transitions toward sustainability. These insights are also relevant for practitioners, as urban freight systems need to transition toward sustainability but are described as difficult to steer in current research. Such insights, therefore, require an expansion of current knowledge. These needs for further knowledge are elaborated in the next section.

Research problem

As described in the previous sections, urban freight systems are growing, complex, societal systems that must transition toward sustainability. Sustainability transitions of such societal systems are challenging for both policymakers and actors (Churchman & Longhurst, 2022). According to Köhler et al. (2019), this is because multidimensional, multi-actor processes require the co-evolution of interdependent factors in long-term, open-ended, and uncertain processes, which challenge vested interests and values and align with a normative direction of development toward sustainability, a public good. The current knowledge about urban freight transitions can be complemented in several ways, for example, by examining how different dimensions of urban freight systems, their contexts, and governance interact in transitions toward sustainability. The next sections specify the needs for further research from four perspectives: research perspective, barriers to development, governance challenges, and city size. These aspects lead to the aim of this research.

Research perspective

Explaining the complexity of transitions requires holistic perspectives that cover techno-economic, political, and socio-technical dimensions. These are interdependent dimensions that co-evolve in a transition process (Cherp et al., 2018; Edmondson et al., 2019). Churchman and Longhurst (2022) emphasize that a substantial body of research on urban freight systems examines these from a techno-economic perspective. The techno-economic focus centers on quantitative and technical dimensions, including route optimization, last-mile solutions, alternative fuels, vehicles, and supply-and-demand issues. Socio-technical perspectives focus instead on the interconnectedness of dimensions such as technology, infrastructure, policy, organization, and stakeholders in a system (Schot et al., 2016). Urban freight researchers have previously suggested that empirical studies, incorporating multiple stakeholder perspectives, can yield new insights into urban freight systems (Cui et al., 2015; Imre et al., 2021). These types of studies remain, however, scarce in urban freight research where organizational and cooperation aspects have received less attention (Meyer, 2020; Churchman & Longhurst, 2022).

City size

Urban freight systems of all sizes must transition toward sustainability. Urban research tends to focus on the largest cities, but small and medium-sized cities, with populations ranging from 50,000 to 250,000 inhabitants, are common in Europe (Bell & Jayne, 2009; Eurostat, 2024; Dijkstra & Poelman, 2012) and must also transition. These cities operate under different resource and spatial conditions compared to larger cities. Consequently, it is essential also to study the governance

of urban freight system transitions within this specific context (Christidis et al., 2024; Bell & Jayne, 2009).

Barriers to development

As described in previous sections, urban freight systems must move toward sustainability, but various barriers hinder this transition. Current urban freight research provides a fragmented picture of the barriers to the development of urban freight systems. A variety of barriers are identified in different contexts. These barriers can relate to techno-economic, socio-technical, and political aspects within and around urban freight systems. Addressing these barriers is essential to enable change (Lindholm, 2010), but this requires an overview as well as detailed knowledge of the barriers to development from an urban freight system perspective.

Governance challenges

Governing urban freight systems to transition in a specific direction, for example, toward sustainability, is challenging due to their inherent complexity, their interconnectedness with the surrounding society, and their numerous stakeholders with different and sometimes conflicting agendas (Aljohani & Thompson, 2018; de Carvalho et al., 2019; Boudoin et al., 2014). Stakeholders' decisions depend on their own priorities (Taniguchi & Thompson, 2015; Butrina et al., 2017) and, as noted by Gammelgaard (2015) and Gammelgaard et al. (2017), only stakeholders perceiving a value of developing will implement necessary changes, but the stakeholders' combined activities form the development of the urban freight system.

Governing the development of complex societal systems, such as urban freight systems, to achieve both short- and long-term goals requires new governance models that combine the strengths of earlier approaches, focus on cooperation, and balance different interests (Loorbach, 2010; McMillan & Overall, 2016; Alford & Head, 2017). Aligned with this, urban freight researchers have suggested that city organizations can use their multiple roles to govern urban freight systems to develop toward sustainability (Visser, 2014; Lindholm & Browne, 2013; Schliwa et al., 2015). Hansson et al. (2023) suggest using governance theoretical concepts to emphasize decision-making processes within urban freight systems with multiple actors and governance levels. Smith (2020) suggests that strategic guidance, a long-term focus, and cooperation among authorities can support the creation of common goals among stakeholders. Hartl et al. (2024) suggest that transition management perspectives could provide insights useful for cities' governance of mobility systems toward sustainability.

Research aim

Given the opportunities and relevance of expanding current knowledge, this research aims to explore the conditions for urban freight system transitions toward sustainability, primarily in small and medium-sized cities, and by employing a socio-technical transition governance perspective.

Purpose and research questions

The overall purpose of this research is to explore how city administrations govern urban freight system transitions toward sustainability. The research is built on four studies, which altogether help answer the research questions:

1. Which types of barriers to transitions toward sustainability are found in urban freight systems?
2. How do city administrations in small and medium-sized cities govern their urban freight systems from a transition perspective?
3. How do city administrations' resources and governance activities in small and medium-sized cities influence their capability to manage transitions of their urban freight systems?

Research focus and delimitations

This research contributes to the line of logistics and transportation research concerned with transition governance and the strategic management of change in urban freight systems. It focuses on city administrations' possibilities to affect and steer the development of these systems toward sustainability.

The research primarily focuses on small and medium-sized cities (Dijkstra & Poelman, 2012). This, since small and medium-sized cities are common in Europe and must be part of a broader transition toward sustainability, and research about urban freight system transition governance in this type of cities is needed (Christidis et al., 2024; Bell & Jayne, 2009).

The research is focused on transitions toward sustainability. Sustainability definitions are often characterized by a balance between ecological, societal, and economic dimensions (Waseem & Kota, 2017). This research was inspired by the view of the Stockholm Resilience Centre (2016), which holds that the environmental dimension of sustainability is a critical precondition for achieving social and economic sustainability. An environmental focus, therefore, represents a

necessary first step in the complex path toward truly sustainable urban freight systems. The research thereby aligns with Behrends et al. (2008), who state that factors across different areas must be addressed on the path toward the goal of sustainable urban freight. This research also aligns with the work of Hassan and Lee (2015). They suggest that sustainability in cities should be understood as a process of transition toward higher levels of sustainability.

Reading guidance

The research compiled in this thesis concerns the governance of urban freight system transitions toward sustainability. It is built on the results of four studies, each with a distinct focus, that collectively address the overall research purpose. This introductory part of the thesis (i.e., the kappa) can be read as a self-contained summary of the research. Details of the individual studies are available in the appended paper.

This part of the thesis is organized into six chapters. Chapter 1 introduces the research background, purpose, and research questions. Chapter 2 elaborates on the research's theoretical framework. Chapter 3 describes the methodological considerations, including research design and quality. Chapter 4 summarizes the four appended papers, highlighting their individual contributions and their relationship to the overall research. Chapter 5 discusses the results in relation to existing knowledge and provides answers to the research questions. Chapter 6 concludes the research by presenting key findings, contributions, and implications, acknowledging limitations, and proposing directions for future research.

Readers primarily interested in the synthesized findings and their implications may focus on Chapters 5 and 6, while those seeking methodological depth should consult Chapter 3 and the individual papers.

Frame of reference

Urban freight systems are complex, difficult-to-steer societal systems essential to urban societies that must transition toward sustainability. This research builds new insights into urban freight transition governance by drawing on theoretical input from three areas of prior research: urban freight, strategic management, and transition governance for socio-technical systems. Present urban freight research has helped establish the state of knowledge regarding urban freight systems and their inherent components, including stakeholders, activities, and barriers to their sustainable development. Strategic management and transition governance theory provided this research with analytical lenses for studying urban freight system transitions. Strategic management theory provided the initial analytical inspiration, helping to explore the relationships between barriers to development in urban freight systems and to develop a process for addressing them. Transition governance theory served two purposes. First, it provided an analytical perspective on transitions, helping build a holistic picture of urban freight systems and their interrelations with the surrounding society. Second, it provided input for the analysis of city administrations' governance of these systems from a transition perspective. The following sections elaborate on the theoretical input in three parts: urban freight systems, strategic management, and transition governance of socio-technical systems.

Urban freight systems

Urban freight logistics systems are the processes and operations that move goods in cities and urban areas (Amaya et al., 2021; Kiba-Janiak, 2017). While sometimes referred to as urban logistics, city logistics, or urban goods logistics, the term urban freight is used throughout this thesis. Urban freight systems generate wealth for urban areas by enabling smooth logistics flows (Haarstad et al., 2024). These systems are increasingly important in urban areas but pose challenges when it comes to balancing economic and environmental sustainability interests (Cui et al., 2015). Growing unsustainable urban freight systems increase their negative impacts on societies, the environment, and the economy in urban areas (Baker et al., 2023; Behrends et al., 2008). Their importance and their impact on the urban environment

make them essential to consider for cities with ambitions to develop toward sustainability (Bridges, 2016; Anderson et al., 2005).

Urban freight systems encompass a wide range of goods and services (Quak & Kin, 2024). Urban freight includes parcel and express deliveries, as well as general cargo, construction, facility, return, waste, and temperature-controlled logistics. Current urban freight research tends to focus on isolated aspects, such as technical solutions or restrictive measures, but overlooks urban governance and policy (de Abreu et al., 2026).

Figure 1 serves as an initial conceptual reference for urban freight systems in this thesis. It depicts the urban freight system in a societal context with a multitude of factors important for its development (Schot et al., 2016; Edmondson et al., 2019; Christidis et al., 2024). Factors in the societal context of the urban freight system, their interrelations, and interactions with the system shape its development. The system’s reason for existence is to move goods through logistics flows. Logistic flows are, hence, placed at the center of the model.

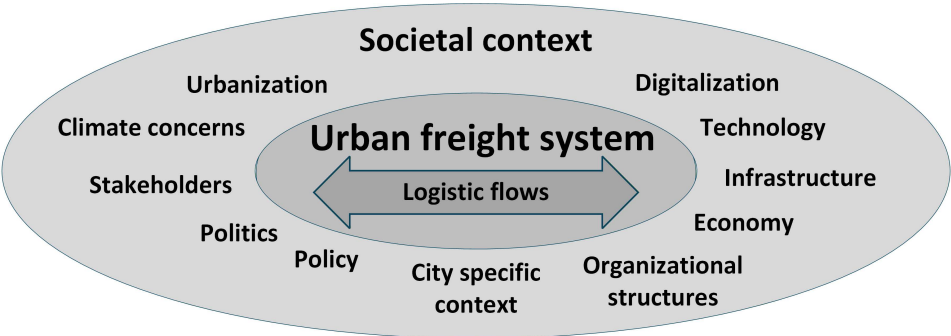


Figure 1. Conceptual representation of the urban freight system and factors affecting its development.

The figure is a simplified conceptual model of the complex system in focus of this research, the urban freight system and factors affecting its development. Information is intentionally omitted from the figure to enhance its readability. Urban freight systems themselves include, for example, a multitude of dimensions, such as different types of flows, logistics, and transport-specific technologies, such as routing systems and vehicles, and infrastructure, such as warehouses and terminals, which are all important for a functioning urban freight system but are not the focus of this research, and thereby not included in the figure.

Stakeholders

A multitude of stakeholders impacts the development of urban freight systems (Taniguchi & Thompson, 2015). Stakeholders with direct impact on the system are actors in it (Ballantyne et al., 2013). According to this definition, shippers, receivers, freight transport operators, and authorities, with their respective subgroups, can be considered actors. Other stakeholders include vehicle manufacturers, public transport operators, property owners, citizens, and NGOs such as trade unions and environmental organizations (Ballantyne et al., 2013; Katsela & Pålsson, 2019). Companies generally strive to maximize profitability and customer satisfaction, while local authorities aim to maximize a geographic area's attractiveness by balancing economic, environmental, and social interests (Taniguchi & Thompson, 2015; Katsela & Pålsson, 2019).

One of the stakeholders in an urban freight system is the city organization. In an urban freight system, the city organization is unique due to several aspects, such as its wide spectrum of entities including both public services and the city administration, its multitude of roles interacting with the system, and its close connection to politics (Akgün et al., 2019; Balm et al., 2016). As a public actor, the organization should ensure public value in its governance efforts (Docherty et al., 2018). The local government in Swedish cities consists of the city council, the political body, and the city administration, the city's bureaucratic arm. Formally, elected representatives decide on policies, and the city administration prepares information for decision-making and implements policies. In practice, city administrations and their officials have important governance responsibilities, deal with stakeholders, and serve as a link between politicians and local society. In a Swedish context, a city, or formally, the municipality, is also powerful when it comes to urban planning (Browne et al., 2024). It has exclusive rights to urban planning, meaning it can decide on land use through both comprehensive and detail plans (Boverket, 2024). This power can be used to affect, for example, the logistics activities within an urban area.

Barriers to development in urban freight

Barriers to the development of more sustainable freight are frequently reported in urban freight-related research studies, but, from an urban freight system perspective, this reporting is fragmented. The barriers are, for example, identified in very different settings ranging from Swedish cities with some tens of thousands of inhabitants to megacities in China and Brazil (Björklund & Gustafsson, 2015; Bandeira et al., 2018; Liu et al., 2018).

Barriers to development span different areas as well. Paddeu et al. (2018) found, for example, barriers to the establishment of viable urban freight consolidation centers in economic, cultural, social, and practical areas. Lindholm and Browne (2013), in

their study of freight partnerships, point to the organization of stakeholders and their cooperation. Barriers to the adoption of policies were found to include traditions, lack of knowledge among stakeholders, organizational factors, stakeholders' unaligned goals, and insufficient cooperation among stakeholders (Nordtømme et al., 2015; Buldeo Rai et al., 2017; Van Duin et al., 2018).

Studies regarding the adoption of electric freight vehicles identify barriers in areas such as technology, infrastructure, business models, policies, and politics (Melander et al., 2022; Löfstrand et al., 2013). Löfstrand et al. (2013) also highlight the number of stakeholders and the complexity it generates as a challenge. This complexity can itself become a barrier to development (Löfstrand et al., 2013; Pålsson & Johansson, 2016). Other studies identify a lack of assessment models for alternative solutions, a lack of common language, and research fragmentation as barriers (Bandeira et al., 2018; He, 2020; Schliwa et al., 2015).

Freight research has also shown that freight matters receive limited attention from local authorities (Allen et al., 2014) and that their awareness of and competence in these matters are insufficient (Ballantyne et al., 2013). Unstable governance risk confusing stakeholders (Moloney & Horne, 2015; Van Duin et al., 2018) and, as noted by Paddeu et al. (2024) and Williamsson and Moen (2022), uncertainties can make actors otherwise willing to go to the forefront of a transition process reluctant to change. Altogether, these reports provide a fragmented picture of the barriers to urban freight systems' transitioning toward sustainability.

Governing the direction of development

Urban freight systems are considered hard to govern and develop in a specific direction. This is due to their complexity with a multitude of stakeholders with differing agendas and numerous other barriers to development (de Carvalho et al., 2019). Local authorities, such as city administrations, must consider and balance the needs of different stakeholders in their governance (Macharis & Milan, 2015). However, as public actors, they should also enhance public value in their governance efforts (Docherty et al., 2018).

Effective governance approaches proactively engage stakeholders in the development process and secure knowledge building and dissemination between the parties involved (Browne et al., 2023). Sustainable urban freight approaches can be achieved through integrated stakeholder participation and iterations until a satisfactory output is achieved (Gatta et al., 2017). Governing parties can support transitions by visualizing stakeholders' mutual interest in a transition (Gammelgaard, 2015), but managing stakeholders is challenging and an area requiring further research (Lagorio et al., 2016).

Urban freight systems are affected by several levels of governance. Authorities influencing urban freight systems exist at local, regional, national, and international

levels (Ballantyne et al., 2013). Local authorities, such as city administrations, often lack resources for urban freight matters (Akgün et al., 2019; Browne et al., 2023). This hampers their ability to accumulate knowledge, gain insights, and handle the complexity related to freight matters (Akgün et al., 2019; Ballantyne et al., 2013). Lack of insight also means that policy measures risk being counterproductive, since their consequences are not correctly predicted (Kin et al., 2017). Additionally, the goals for urban freight measures are often vague and unmonitored (Akgün et al., 2019). Unclear governance can confuse stakeholders and make development processes unstable and inefficient (Moloney & Horne, 2015; Van Duin et al., 2018). Uncertainties can also discourage actors from developing (Paddeu et al., 2024). A lack of attention to freight matters also means that they risk being overlooked in, for example, environmental plans (Lindholm, 2010; Allen et al., 2014; Goetz & Alexander, 2019).

City administrations, nonetheless, also have considerable power over their urban freight system (Shrestha et al., 2024; Rosales, 2024). Within their local freight systems, they can influence the development of technologies and cooperation (Plazier et al., 2024). City administrations traditionally use policy tools to shape development, but they also employ a broader spectrum of measures (Bjørgen et al., 2019; Holguín-Veras et al., 2020; Fossheim & Andersen, 2017). City administrations can, in cooperation with the rest of the city's organization, for example, act both as the authority and a business partner toward other stakeholders in the system (Moen, 2014). As an authority, it can use a combination of policy tools, such as low-emission zones and stakeholder involvement in urban planning (Goetz & Alexander, 2019; Bjørgen et al., 2019). Nevertheless, engaging stakeholders in urban freight system development should be part of comprehensive strategies and have a specified purpose to be meaningful (Le Pira et al., 2024).

Large cities increasingly try to manage this type of transition (Hodson & Marvin, 2010). City administrations, however, seem prone to focus on techno-rational aspects, such as vehicle electrification, rather than further demanding but also more impactful political and institutional aspects in their governance (Shrestha et al., 2024). This can lead to incremental development of societal systems and the favoring of established actors' interests rather than disruptive changes (Nagorny-Koring & Nochta, 2018). Cities adopting broader approaches to the governance of urban freight, which combine measures, experiments, stakeholder relations support, and political anchorage, can, on the other hand, achieve lasting changes and more effective governance (Bjørgen & Ryghaug, 2022; Shrestha et al., 2025).

Strategic management

One component of governing urban freight systems toward transitions would be to address identified barriers to such a development. This requires long-term governance dedication and political backing as well as methods that stimulate stakeholder participation (Gammelgaard, 2015; Smith, 2020). Participation is stimulated by involvement and co-creation of value (Gammelgaard et al., 2017; Gammelgaard, 2015). Scholars in the field of strategic management, like Bryson (1988), David and David (2017); Dutton and Duncan (1987); Kotter (2012); Kotter (2008), address in different ways several of these challenges and provide insights relevant for the governance of urban freight system transition processes toward sustainability.

Strategic planning enables organizations to respond effectively to emerging situations (Bryson, 1988). As a structured process, strategic planning produces decisions and actions that guide organizational development. By facilitating coordination across functions and organizational boundaries, strategic planning supports goal achievement by integrating organizational purpose with internal and external environmental factors (Bryson, 1988; David & David, 2017).

Successful strategic planning requires specific organizational capabilities and roles. Organizations must establish process sponsors to legitimize the effort, process champions to drive momentum, and a dedicated team (Bryson, 1988). Participants must be equipped to manage uncertainty and adapt to changes throughout the process, while maintaining effective platforms for communicating and engaging with diverse stakeholders. However, decision-makers face inherent attention constraints, as urgent operational issues can divert focus from critical strategic priorities (Dutton & Duncan, 1987; Kotter, 2012). Consequently, successful transitions require a guiding coalition of stakeholders who recognize the importance of proposed changes, provide active support, and possess the mandate to implement necessary transitions (Kotter, 2012).

Addressing transitions in urban freight systems from a holistic system perspective has similarities with the strategic planning process suggested by Bryson (1988). In this research, the strategic management framework helped explore the relationships between identified barriers to change in a transition process and how these can be effectively addressed at the strategic management level. The process starts with creating a common understanding of the problem(s) among relevant stakeholders before strategies for change are developed and ultimately implemented.

Transition governance

Theories from the field of transition governance provided this research with two frameworks of particular importance. Transitions are large-scale changes in societal systems (Hölscher et al., 2018), such as urban freight systems, and involve stakeholders across different organizations, thus also interorganizational interrelations. The multi-level perspective on socio-technical transitions (Geels, 2011) provided the research with a framework for analyzing urban freight systems and their context from a socio-technical transition perspective, including their interrelations. The transition management framework (Frantzeskaki et al., 2012; Loorbach, 2010) provided the research with a framework for analyzing the governance of these systems from a transition perspective. These two parts of transition governance theory are described in the next subsections.

A multi-level perspective on socio-technical transitions

This research utilizes the multi-level perspective on socio-technical transitions as a foundational framework for analyzing the complex interrelations within urban freight systems and their contexts (Geels, 2011). The multi-level perspective (Figure 2) provides a holistic overview of how components of a socio-technical system influence its development. It emphasizes that transitions in complex, open systems, such as urban freight, involve various factors and forces at different levels (landscape, regime, niche). Understanding the interdependencies between these components is critical for those attempting to govern these systems strategically to develop in a specific direction.

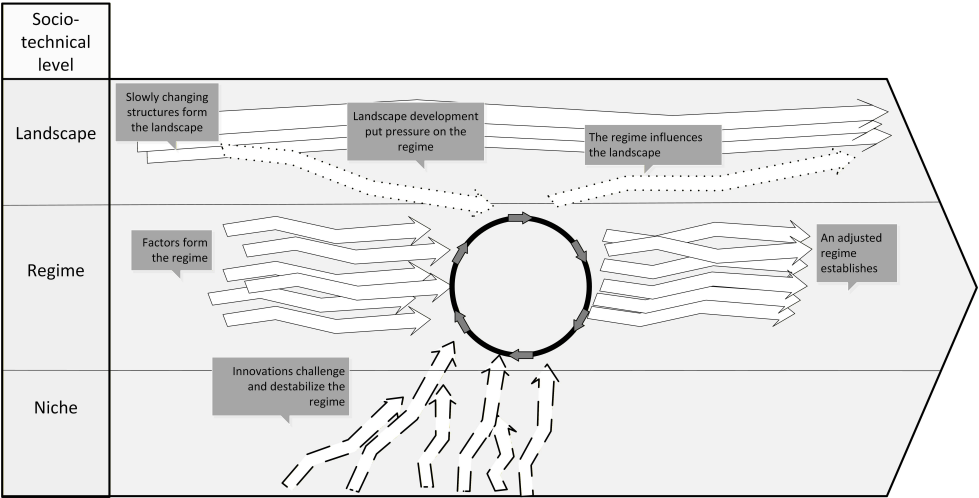


Figure 2. A multi-level perspective on socio-technical transitions, adapted from Kervall (2023).

Viewed from a multi-level perspective, a socio-technical system consists of a regime of factors that stabilize and maintain the current system order. This current order is challenged by external forces from the surrounding context, such as the landscape (broader societal development trends) and niches (new ideas and innovations) (Geels, 2011).

In societal systems, for example, urban freight systems, the regime can be maintained by factors such as technology, infrastructure, economy, policy, knowledge, and discourses (Geels, 2012). The factors that form the regime contribute to the incremental development of the system over time through actors within it. These actors maintain the regime through their actions and beliefs, creating stability in the system but also resistance to change and radical innovation.

There are several reasons actors reproduce the regime, including economic interests, policies, beliefs, uncertainties, and goal conflicts (Kemp & Loorbach, 2003). Economic aspects such as returns on investment, economies of scale, and low costs are examples. Goal conflicts occur, for example, when actors pursue different or incompatible goals or have different time horizons for their work (Geels, 2011). Another factor maintaining regimes is the political arena, where simplification of problems and their solutions, and the need to show strong leadership, is necessary (Klijn & Koppenjan, 2012). These political demands prioritize short-term wins and low complexity over addressing long-term, complex matters that are sometimes more relevant. From a transition perspective, established practices that provide stability for society and societal systems, such as urban freight systems, can act as barriers to change (Geels, 2011).

Regimes can be challenged by forces from the surrounding societal landscape or from niches (Geels, 2012). The landscape consists of factors in the surrounding societal context that are long-term and cannot be significantly affected by actors in the system. The societal context of an urban freight system is, for example, rather stable over time, even as long-term societal trends such as digitalization, e-commerce, urbanization, and climate concerns evolve (Taniguchi & Thompson, 2015; Cui et al., 2015). Niches, on the other hand, are bounded environments where radical ideas and innovations can develop (Geels, 2011). If these are successfully developed and exposed to a broader environment, ideas and innovations from niches can destabilize a regime. The system will then, after a period of instability, find a new equilibrium in which a new combination of forces balances each other, and form a new regime. A challenge for managers attempting to govern urban freight system transitions toward sustainability will be to determine a combination of available interconnected factors that affect the system to transition in the desired direction.

In this research, the multi-level perspective was introduced in Paper 3 and utilized to analyze an urban freight system. The use of this perspective provided an

important foundation for the insights into barriers and governance capability developed in this thesis.

Transition management

Transition management, in contrast to strategic management theory, has an interorganizational focus and concerns changes in socio-technical systems, such as urban freight systems, where changes affect multiple organizations and stakeholders. Transition management theory integrates components from governance, network, and innovation theory (Klijn & Koppenjan, 2012; Frantzeskaki et al., 2012). Combining the strengths of different theoretical origins increases the likelihood of achieving both long- and short-term societal goals (Loorbach, 2010). When needed, public managers should combine horizontal networking, stakeholder coordination, and the stimulation of innovation with hierarchical approaches to achieve societal goals (Klijn & Koppenjan, 2012; Rhodes, 2007; Kjaer, 2011).

From a governance perspective, transitioning a socio-technical system, such as an urban freight system, is a multidimensional wicked problem (Kemp & Loorbach, 2003). According to Alford and Head (2017), this means the problem might not be solvable in a traditional way. The governance task is merely a matter of working toward an improved situation. The governance approach itself must therefore be adaptive and evolve over time (Tukker & Butter, 2007). It must also recognize that a transition results from parallel processes and actions of actors beyond the direct control of any single governing party (Kemp & Loorbach, 2003). Guiding principles for the long-term governance of such complex systems include, according to Loorbach (2010), to:

- Let long-term perspectives guide short-term actions
- Accept uncertainties
- Support networks and self-organization
- Make room for innovation

Transition management theory was specifically used in this research to structure the analysis of empirical data on a city administration's governance activities in Paper 3. This theory is also a cornerstone of the analytical framework, which, in Paper 4, is used to assess cities' capabilities to manage a transition.

Research methodology

This chapter explains the methodological considerations in the research on an overall level. The methodological considerations for each study are detailed in the appended papers.

Research approach

The studies included in this thesis move progressively from an inductive toward an abductive approach (Bryman & Bell, 2017). The research builds on qualitative methods and is a systematic approach to explore and advance the insights into the studied phenomenon: urban freight system transitions toward sustainability and how these are governed and affected by city administrations in small and medium-sized cities. The results contribute to the theoretical understanding of the phenomenon, but can also be further advanced.

Philosophy of science

Explicating the ontological and epistemological foundations of this research enables readers to understand the underlying assumptions and methodological choices that shape the studies. Ontology concerns the nature of reality and what exists, while epistemology addresses how knowledge about that reality can be acquired and what constitutes valid knowledge (Bryman & Bell, 2017). This research has adopted a paradigm close to critical realism as described by Lawani (2020). This means that this research assumes that an objective reality exists regardless of what we know about it. This reality, however, is stratified and complex, and the underlying mechanisms are not directly observable. This means that our knowledge of reality is socially constructed and a result of interpretations. Accordingly, this research constitutes a systematic effort to explore, describe, and understand reality, supported by theoretical frameworks. The research utilizes theoretical frameworks to interpret data, uncover underlying mechanisms, generate theoretical, empirical, and practical insights, and advance our common understanding of the studied phenomena.

Systems approach

The approach of this research has its foundation in the core principles of systems thinking, which posits that a system is more than merely the sum of its parts (Arnold & Wade, 2015). This thinking underscores the need to understand both the system's components and their interactions to accurately determine the system's overall behavior and output (Björklund, 2018).

Focusing on holistic system effects has served as a guiding principle for all four studies underpinning this research. It necessitated incorporating multiple stakeholder perspectives (Papers 1 and 3) and examining various facets of urban freight system development (Papers 1–4). The research progressively deepened its engagement with systems thinking as defined by Squires et al. (2011). Initially, the research focused on identifying and structuring isolated factors (Papers 1 and 2), gradually shifting toward understanding the complex relationships among different areas within and outside urban freight systems. This holistic systems lens was essential for analyzing the complexity of these systems and for investigating how they can effectively be influenced to transition toward desired sustainability goals (Papers 3 and 4).

Research design

The research design provides the overarching structure upon which the selection of methods for data collection and analyses relies (Bryman & Bell, 2017). The overall purpose of this research, to understand urban freight system transitions toward sustainability and how these are affected by city administrations' governance, guided the research design toward qualitative methods. Qualitative methods were employed across the studies as they are well-suited to achieving the research aim of exploring a complex societal phenomenon. This approach facilitated the development of both holistic and in-depth insights into urban freight transitions and the interconnected factors shaping them, in line with the systems thinking that underpins this thesis. Qualitative research can encompass different types of studies such as case studies, literature reviews, ethnographic, narrative, and document studies (Bryman & Bell, 2017; Miles et al., 2020). This research is based on three case studies of small and medium-sized cities and a systematic literature review. Case studies were chosen since this type of study has the potential to provide rich data on bounded environments (Bryman & Bell, 2017; Yin, 2014). This allows exploration of different dimensions of cases and their interrelations, but limits the statistical generalizability of the research results. Multiple case studies have the advantage of providing rich data on cases, increasing the possibility of exploring patterns across cases, and the generalizability of the research results, but are more demanding than single case studies (Yin, 2014; Miles et al., 2020).

This research used a systematic literature review to build an overview of the research field, generate additional insights, and identify relevant paths for further research. Systematic literature reviews can be seen as a core example of pragmatic management research (Tranfield et al., 2003). They can provide a foundation for further research by offering an overview of a research area and its development (Snyder, 2019). They can also provide value for practitioners through their combination of scientific rigor and relevant insights grounded in accumulated knowledge (Tranfield et al., 2003).

The research design enabled the research to achieve its purpose through a combination of four studies summarized in Table 1. The design allowed the researcher first to explore and become accustomed to the field of research through rich data from a bounded system, in combination with a literature review that provided an overview of the field. It then allowed the researcher to develop a theory-supported interpretation of the research results. Thus, by uncovering mechanisms beyond the observable, the researchers could generate further insights. Finally, these insights were utilized to allow the researcher to holistically understand and describe how urban freight transitions are affected by city administrations' governance and how this, in turn, affects their capability to manage these transitions.

The purpose of Study 1 (presented in the appended Paper 1) was to begin exploring barriers to transitions by studying the urban freight system in a medium-sized city through multiple stakeholder perspectives. Study 1 was thus designed as a case study. This is because such studies can provide rich pictures of a bounded system (Watson, 1994; Yin, 2014). The study's approach aimed to let the data shape the process and was inspired by grounded theory (Corbin & Strauss, 2008). The study aimed to generate a wealth of data that could be analyzed for insights and to lay the foundation for further studies.

The intention of Study 2 (presented in the appended Paper 2) was to continue exploring the research field and to provide a robust, holistic picture of the barriers to change that emerge in urban freight research, and to identify relevant avenues for future research. Study 2 was thus designed as a systematic literature review (Snyder, 2019) with the insights from Study 1 serving as a point of departure for the qualitative analysis.

The purpose of Study 3 (presented in Paper 3) was to explore and describe urban freight system transitions by combining rich data about a medium-sized city and transition theory. The study was thus designed as a case study and addressed one of the future research topics previously identified in Study 2.

The purpose of Study 4 (presented in the appended Paper 4) was to utilize the insights from Studies 2 and 3 to explore how small and medium-sized, logistically prominent cities with explicit sustainability ambitions govern their urban freight system transitions toward sustainability and how this relates to the city administrations' capability to manage a transition process. The study was designed

as a multiple case study to enable detailed insights into the cases, comparison between them for pattern identification, and increased generalizability (Miles et al., 2020).

Table 1. The four studies behind the thesis.

Study	1	2	3	4
Purpose	Explore barriers to change from a multi-stakeholder perspective	Explore barriers to change from a holistic system perspective	Develop a framework applicable to transition analysis	Explore cities' governance from a transition perspective
System	One urban freight system	Multiple urban freight systems	One urban freight system	Six urban freight systems
Unit of analysis	Transition barriers related to one urban freight system	Transition barriers in urban freight systems	A city's urban freight system, its societal context, and governance activities	Cities' governance of their urban freight systems
Study design	Case study	Systematic literature review	Case study	Multiple case study
Main data collection method	Semi-structured interviews	Systematic database searches	Semi-structured interviews	Semi-structured interviews
Data	Empirical	Journal articles	Empirical	Empirical
Analysis of data	Qualitative	Qualitative	Qualitative	Qualitative
Contributing to RQ	1	1 & 3	2 & 3	2 & 3

Reflections on the research design

The selected research design, like any design, presents both notable strengths and inherent limitations. The design predominantly utilizes qualitative methodologies and case studies complemented by a systematic literature review.

The design facilitated a systematic progression of insights, moving from specific case explorations (Studies 1 and 3) to a broader literature synthesis (Study 2), and finally to a multi-case comparison and synthesis (Study 4), thereby building a cumulative body of knowledge. This gradual, iterative approach is a key strategy for developing insights that are robustly grounded in empirical data (Miles et al., 2020). The reliance on semi-structured interviews across the empirical studies ensures depth and richness of data. This richness, according to Yin (2014), allows for contextual understanding, which, in this research, enabled a detailed exploration of how various factors within and around urban freight systems are interlinked. The main data collection method, semi-structured interviews, was complemented by document studies within the case studies. This approach allowed for triangulation of data across multiple sources, a vital procedure for verifying findings and enhancing the overall quality of the results.

Notwithstanding, the research design also has limitations. The findings are not statistically generalizable. Instead, they offer analytical generalizability within specific limitations. Even though the conclusions are robust for the studied contexts, they should be applied with caution in other contexts. The heavy dependence on subjective data, such as respondents' perceptions and experiences, creates the potential for biases such as social desirability bias. The use of triangulation between data sources was a conscious effort to mitigate this weakness and validate data. Qualitative analysis inherently involves interpretation by the researcher. To mitigate potential biases from this part of the research process, the data analysis was conducted systematically and followed rigorous, pre-defined procedures guided by established methodological literature. These measures are further described in the appended papers.

Research process

This PhD thesis is built upon four interconnected studies conducted from 2019 to 2025. All studies culminated in papers submitted to peer-reviewed journals; Papers 1, 2, and 4 are published. Paper 3 is included in its submitted form. Figure 3 illustrates the research process. The figure gives a very simplified overview of the research process. The process has, in reality, been much more complex. Several of the studies were conducted at different stages, and both studies and papers were developed over time through different peer-review processes, before the final journal papers indicated in the figure were completed. My research process has also included a licentiate thesis, presented in 2023, a long period of COVID-19 restrictions, and many other events not included in this picture that affected the process to a certain degree. Earlier versions of Paper 1 and Paper 3 were presented as peer-reviewed conference papers at the NOFOMA conferences in 2020 and 2022, respectively, and early results from Paper 4 were presented at the International Workshop for Sustainable Road Freight in 2023. The process around each study included in this thesis is further described below.

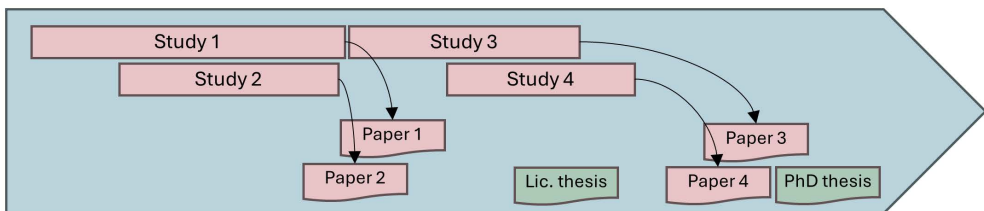


Figure 3. Chronological overview of the research process, including the studies and key outputs.

Study 1 started in 2019 and was finally presented in a journal article in 2022 (Paper 1). An early version of the study was presented at NOFOMA 2020. Study 1 served

as an introduction to the research area for me. The study design was inspired by a grounded theory approach (Corbin & Strauss, 2008). The inductive and explorative approach of the study, where one medium-sized city's urban freight system was explored through the input from multiple stakeholders, provided me with insights, grounded in empirical data, about the barriers to development and the complex interrelations between stakeholders in the system.

Study 2, a systematic literature review, was initiated in 2020, finalized in 2021, and published as a journal article in 2022 (Paper 2). Study 2 broadened and developed my insights into the research subject. The results from Study 1 provided a starting point for analyzing a sample of earlier research articles and helped me identify and categorize the barriers to change in previously studied contexts. The holistic perspective on barriers to development across various urban freight systems prompted us to search for a structure that could help us explain how these barriers are interrelated. This resulted in the development of a model of understanding, based on strategic management theory, and a proposed order of priority for attempts to overcome barriers to change in urban freight systems.

Study 3, a second case study, was started in 2022. An early version of the paper was presented at NOFOMA 2022. Until recently, the paper had been pending due to other priorities before it was developed into the appended journal paper (Paper 3). The study began with a narrative literature review aimed at identifying theories that could provide insights into the factors affecting urban freight system development processes. The process continued with the development of an analytical framework for urban freight system transitions. This framework was evaluated using empirical data to assess its contribution to theoretical and practical insights into the factors affecting a medium-sized city's urban freight system and their interrelations. The results showed that the framework enabled new insights into the studied case. It helped us relate the earlier observed components of the urban freight system and its governance to one another and analyze the picture from a transition perspective.

Study 4 was initiated in 2023 and finalized in 2024. A journal paper based on the study was published in 2025 (Paper 4). Inspired by and building on the results of Studies 2 and 3, the fourth study utilized transition governance theory to explore and understand the city administrations' governance of urban freight systems in six small and medium-sized cities and how this governance affects their possibilities to affect these systems' transitions toward sustainability.

As described in the previous sections, the research presented in this PhD thesis was conducted over six years. It was intended to result in four journal papers, a licentiate thesis, and this PhD thesis. My contribution to each of the appended papers and the studies behind them was substantial. Nevertheless, the studies would not have been the same without the close collaboration with more experienced research colleagues. More details on the contributions can be found in the "List of publications and author contributions." In total, this research process, including numerous

discussions with senior researchers, other PhD students, and practitioners, has contributed to my development toward scholarly independence.

Research quality

Various aspects of research quality have been continually considered throughout the research process. Research methodology literature and frequent discussions with colleagues have provided invaluable support to secure the quality of the research. In this thesis, I chose to discuss research quality using three traditional criteria: reliability, validity, and replicability (Bryman & Bell, 2017). While alternative terminology sometimes appears in qualitative research, these traditional expressions, when adapted to a qualitative context, remain highly relevant and are familiar to a broad readership.

Aspects of quality are already addressed in the research design. Reliability in case research concerns whether a repeated study under the same conditions would arrive at the same results and conclusions (Yin, 2014). A challenge in social research in this regard is the continuous development of the research object. In this research, this challenge was addressed by a systematic saving of raw data combined with thorough documentation of the research process, including interviews and coding procedures, to allow replication of the analyses at a later stage and irrespective of the research object's development.

This research combines empirical case studies with a systematic literature review. The combination of data sources is positive from a validity point of view. Validity concerns whether a study measures what it is intended to measure (Bryman & Bell, 2017). A central challenge in qualitative research is the researcher's interpretation of data and how these interpretations impact the results (Miles et al., 2020). According to Yin (2014), three types of validity are typically relevant to discuss in qualitative case study research: construct, internal, and external validity. Construct validity concerns what data are collected and how, for example, confirmation bias is avoided in the analysis. Internal validity concerns how different noted events are related. In the research presented in this thesis, we addressed construct validity by using multiple sources of information to build the chain of evidence, including interviews, documents, and literature. We also discussed draft results with informants in different forums. To address the internal validity, we supported interpretations of data with theory, worked with cross-case analysis, and frequently discussed lines of thought between the researchers. This was to foster a common, cumulative and multifaceted understanding of the results, such as the link between governance activities and capabilities to manage change (Paper 4). Altogether, these efforts increase both the internal and construct validity of the research findings.

External validity concerns the extent to which the study results can be generalized to other situations and environments (Miles et al., 2020). In qualitative research, this is often referred to as analytical generalizability (Yin, 2014). In this research, the external validity was addressed by employing a combination of measures within the research design. Instead of generalizing findings statistically to a population, we combine, for example, multiple case studies (Papers 1, 3, and 4) with a systematic literature review (Paper 2) and relate our research results to previously developed theory to expand and refine this. My research results show similarities between the studies, even though the contexts are slightly different. The types of transition challenges identified in Paper 1, for example, showed strong similarities with those reported in previous research (Paper 2). The weak local governance of urban freight system development, as indicated by several previous urban freight studies, was empirically confirmed by my research in Papers 1 and 3, and, to my surprise, also by Paper 4. Altogether, this indicates that the results are, to a certain extent, externally valid and, within certain limitations, can be generalized and transferred to other similar contexts.

Results

The research presented in this thesis builds on four studies and corresponding papers (Table 2), which are summarized in this section. The full version of each paper is appended in the Papers section in the printed version of this thesis.

Table 2. Papers, purposes and insights of studies.

Paper	1	2	3	4
Purpose	Explore barriers to change from a multi-stakeholder perspective	Explore barriers to change from a holistic system perspective	Develop a framework applicable to transition analysis	Explore cities' governance from a transition perspective
Insights	Several types of interlinked barriers, both within and outside the studied urban freight system, impede its development.	Several types of barriers impede development in urban freight systems. Managers should consider the interrelations among barrier types to support effective development processes.	The framework generated new insights into factors affecting transitions and their interrelations. The case indicates that current governance should be complemented to support a transition.	Non-systematic transition governance and a lack of resources risk hampering cities' capabilities to effectively shape their urban freight systems to transition toward sustainability.

This research uses different perspectives to gain insights into the research topic. Combining perspectives can be powerful for creating insight (Churchman & Longhurst, 2022; Cherp et al., 2018). This research, therefore, first explored and mapped the reasons why urban freight systems do not transition to sustainability, with the help of multiple stakeholder perspectives from a medium-sized city (Paper 1), and by systemizing information available in the literature (Paper 2). Thereafter, the research developed deeper insights into the factors affecting urban freight system development, their interrelations, and how the development could be affected. This was achieved by again studying a medium-sized city's urban freight system and its governance from a transition perspective (Paper 3). Finally, these refined insights were used to study transition governance for urban freight in six

small and medium-sized cities committed to developing toward sustainability (Paper 4).

Paper 1

The study reported in Paper 1 primarily addresses research question number one, regarding why urban freight systems are considered difficult to develop toward sustainability. The study empirically explores barriers to the development of a fossil-free urban freight system through multiple stakeholder perspectives in one medium-sized city. It complements earlier research, which identified barriers to development in delimited parts of urban freight systems. The study employs an inductive and qualitative approach. Ten categories of barriers of four different types are identified and detailed. The interrelationships between categories and change processes are explored through management theory.

The study provides an overview of the barriers to development in one urban freight system from a holistic perspective, along with insights into how these barriers impede the system's development. The ten categories of barriers identified are technology, infrastructure, economy, knowledge, policy, goals, organization, cooperation, politics, and societal factors. These can be divided into four types: strategic, instrumental, implementational, and contextual barriers, which affect the development of the studied urban freight system in various ways.

Paper 2

The study behind Paper 2 primarily addresses research question number one, regarding why urban freight systems are considered difficult to develop, and continues with a discussion of research question two on how the development toward more sustainable urban freight systems can be facilitated. The study is a systematic literature review of 93 peer-reviewed journal articles. It identifies 11 categories of barriers to change in the literature on urban freight systems, presented from a holistic perspective. The study systematically explores the relationships between barriers and discusses how these barriers to change can be addressed effectively. Cooperation, along with its various forms of struggles, emerges as a significant category of barriers in the study. The most common subcategory of barriers concerns the complex alignment of stakeholders' interests and agendas. The second most prevalent sub-category is the lack of knowledge dissemination among stakeholders within the urban freight system.

The study also explores the relationships between different categories of barriers in urban freight systems and develops a model of understanding for these relationships. This model is based on a structured yet interpretive mapping of 110 relationships between categories, combined with an analytical framework rooted in the strategic management literature.

The barriers can be categorized into three groups and a context. The barriers are interconnected and should, in a managed change process, be addressed as shown in Figure 4.

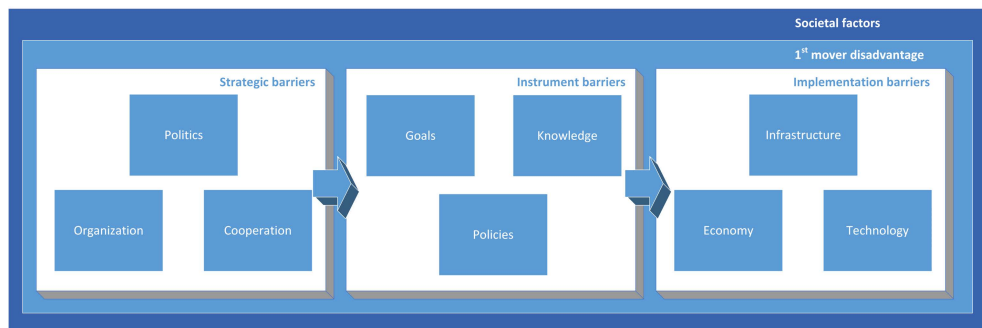


Figure 4. The relationship between barriers, as proposed in Paper 2 (Kervall & Pålsson, 2022).

Strategic barriers concern stakeholders, their organization, and cooperation. Instrument barriers concern the prerequisites for change. Implementation barriers hinder the realization of changes due to economic, technological, or infrastructural reasons. Societal factors are the context affecting urban freight systems. The first-mover disadvantage is seen as part of the context that affects change processes in urban freight systems. It affects actors who move early in a process, potentially discouraging them from change. Societal factors and the first mover disadvantage affect all stages of managed change processes. Overcoming the first-mover disadvantage and strategic barriers should be a priority in managed transitions toward sustainable urban freight systems.

Paper 3

Paper 3 summarizes a study focusing on research questions two and three. The study compiles and evaluates an analytical transition-oriented framework on empirical data to develop theoretical and practical insights regarding how different factors affect a medium-sized city's urban freight system development.

From a socio-technical transition perspective (Figure 5), the urban freight system is a societal system consisting of established interests, structures, and narratives that

collectively exert a stabilizing effect on the system. The system exists within a societal context in which development trends, new ideas and solutions, and governance activities can influence it to transition beyond mere incremental development. According to this perspective, a city administration is both a part of the system and an entity that can influence its development through governance activities. The framework structures governance activities into four interconnected transition governance levels; strategic, tactical, operational, and monitoring, which together explain how city administrations can influence system development beyond incremental change.

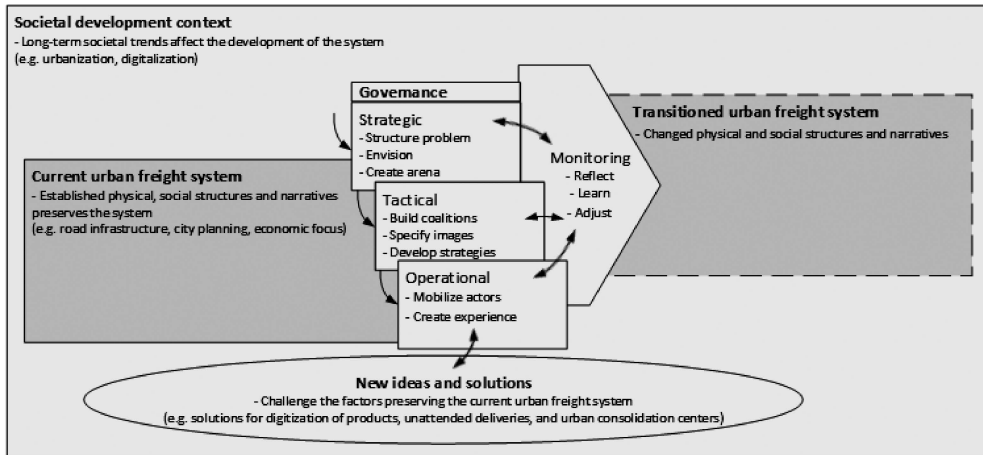


Figure 5. The urban freight system from a transition perspective, adapted from Paper 3.

The study finds that the framework provides value in that it makes it possible to relate earlier observed factors and activities in urban freight systems to each other and to analyze the total picture from a holistic transition perspective. In the empirical case, the analysis indicated governance gaps from a transition perspective. Despite high environmental ambitions, the city organization's governance activities did not systematically steer the urban freight system development toward sustainability. Key strategic components, such as a vision for development and cooperation among important stakeholders, were missing, rendering subsequent operational activities ineffective. The city's focus on innovation projects thereby risks draining participants' resources without generating meaningful momentum toward a long-term transition of the system toward sustainability. The study suggests that unless the city's governance activities are complemented with strategic and tactical governance foundations, these can only be expected to affect the system to incremental development.

Paper 4

The study presented in Paper 4 builds on insights from Papers 2 and 3 and focuses on research question number three. The study refines the framework for transition governance, complementing it with insights from Paper 2 on barriers to change. This resulting framework is used to analyze how smaller, logistically prominent cities with declared sustainability ambitions govern their urban freight systems from a transition perspective. Strategic governance activities give the vision and the prerequisites for a transition. Tactical governance activities build transition capability and address structural barriers to a transition. Operational governance activities implement the development directions through innovations and the overcoming of remaining barriers. Monitoring governance activities are intended to spur reflections and learning. The framework with different types of governance activity types is illustrated in Figure 6.

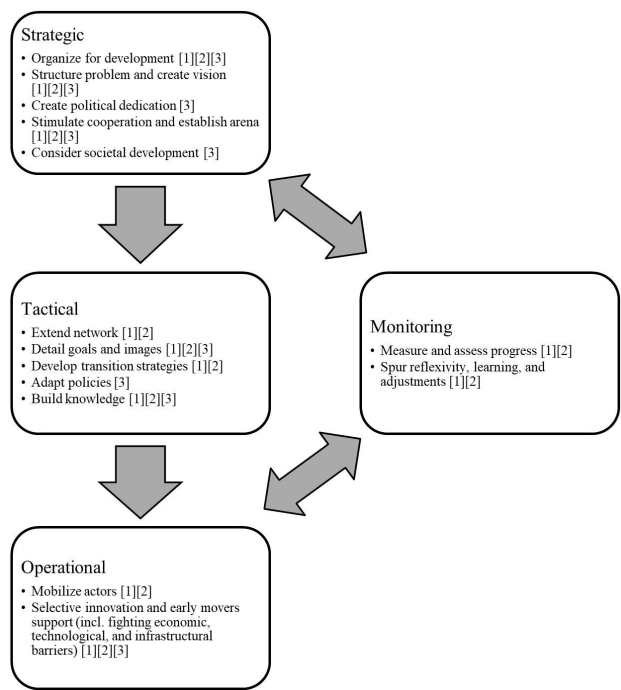


Figure 6. The integrated framework for the analysis of transition governance (Kervall et al., 2026). The numbered labels identify the primary theoretical sources supporting each proposed governance activity [1] Loorbach (2010), [2] Frantzeskaki et al. (2012), [3] Kervall and Pålsson (2022).

The study highlights the connection between comprehensive, integrated governance approaches and the city administrations’ capability to govern transitions toward sustainability. The study suggests that the general lack of resources for urban freight

governance within city administrations is limiting their urban freight transition governance capability.

The study shows, for example, that cities that are active at the strategic governance level are also more active at subsequent levels of governance compared to less strategically active cities. It also suggests that local political commitment is crucial to the city administration's ability to prioritize demanding yet effective governance activities such as stimulating stakeholder cooperation and organizing for change. These activities are important for tactical and operational governance activities. The study also suggests that most of the studied small and medium-sized cities lack a transition-focused, comprehensive structure for their governance practices related to urban freight. Beyond high-level visions, strategic and tactical activities remain underdeveloped. This deficit limits the effectiveness of transition governance since, for instance, necessary networks are not purposively extended, and long-term political commitment to sustainable urban freight transitions is generally lacking. Tactical activities, necessary for building transition capability, are underdeveloped, and operational activities align with the limited strategic and tactical efforts.

Furthermore, data deficiencies hinder cities' ability to monitor the development of their urban freight systems, limiting their capacity to adapt their governance activities effectively during the transition process. The paper highlights that urban freight systems are integrated parts of broader societal systems and emphasizes that policymakers at different levels can effectively support each other's governance efforts. The study contributes to the theoretical understanding of urban freight governance in smaller cities, offers a practical framework for assessing cities' current governance practices, and suggests ways to visualize the results, which can be useful for disseminating insights.

Discussion

Numerous cities, of all sizes, across Europe pledged to develop toward higher levels of sustainability (European Commission, 2024b; Viable Cities, 2024). As integral and vital parts of urban societies, urban freight systems must also develop toward sustainability (Haarstad et al., 2024). This research aimed to explore urban freight system transitions toward sustainability, focusing on the strategic management and governance role of city administrations in small and medium-sized cities. This focus addresses a gap in the literature regarding how cities can use their influence to govern these systems toward sustainability.

The results of this research reveal that urban freight system transitions toward sustainability are not given but are resisted by vested interests and system complexities. Their contexts primarily drive them toward continued growth (International Transport Forum, 2021; Humphreys & Dumitrescu, 2021). Previous research suggests that city administrations can affect the development of urban freight systems but provides limited guidance on how they can leverage this to govern transitions toward sustainability (Lindholm & Browne, 2013; Schliwa et al., 2015; Taniguchi & Thompson, 2015).

The following sections discuss how the insights from this research contribute to and update knowledge on urban freight system transitions toward sustainability, by specifically discussing the three research questions of this thesis.

Transitioning urban freight systems

Transition processes are challenging for both policymakers and actors in societal systems. A substantial body of research on urban freight system transitions has examined the benefits and limitations of new technologies from a techno-economic perspective, while studies adopting a socio-technical perspective, highlighting the interrelations between society and technology, remain scarce (Churchman & Longhurst, 2022).

This research, therefore, progressively utilizes an explicitly socio-technical perspective to develop insights into urban freight transitions in small and medium-sized cities. From this perspective, a transition toward sustainability is understood as a structural change driven by a multitude of interconnected and co-evolving

factors, including technical, economic, political, and organizational factors (Cherp et al., 2018; Edmondson et al., 2019). In existing research, such as Nordtømme et al. (2015), Buldeo Rai et al. (2017), and Van Duin et al. (2018), these aspects are often identified merely as barriers. Our framework re-conceptualizes them as established factors within a complex socio-technical system.

The socio-technical transition perspective on urban freight systems was developed in Paper 3, integrating the multi-level perspective (Geels, 2011; Geels, 2019) and a transition management approach (Loorbach, 2010; Frantzeskaki et al., 2012). This framework provides a holistic picture, structuring previously fragmented factors into an urban freight system operating within a multi-layered societal context.

Utilizing this socio-technical lens developed in Paper 3, it is possible to synthesize the research findings and provide insightful answers to the research questions. The barriers (RQ 1) characterized in Papers 1 and 2 are specific stabilizing factors within this established system. Building on this, Paper 4 explains why governance in small and medium-sized cities struggles to destabilize these factors (addressing RQs 2 and 3).

Barriers to urban freight transitions

The scientific knowledge about barriers to change in urban freight systems is fragmented (Lagorio et al., 2016; Lindawati et al., 2014). It originates from different studies with different system boundaries and purposes. This research addresses this fragmentation by synthesizing and structuring available knowledge. In Paper 2, we identify 11 categories of barriers, their interrelations, and propose a process for addressing them. Our model, unlike previous approaches that primarily focused on isolated projects, for example, Lebeau et al. (2015) or Ehrler et al. (2019), provides an order of priority for effectively addressing these barriers from a strategic to operational level, which represents an advancement from a transition governance perspective. In Paper 4, we also reframe them as established factors that are stabilizing forces in small and medium-sized cities' urban freight systems, but also resist radical change toward sustainability. According to Geels (2011), these factors must be destabilized to enable a transition.

This research, consequently, in both Papers 1 and 2, explores and maps the factors that constitute barriers to transition in urban freight systems. As shown in Paper 2, these stabilizing factors are frequently identified across urban freight studies. Through a comprehensive mapping in Papers 1 and 2, we identified barriers across politics, cooperation, organization, goals, knowledge, policies, infrastructure, technology, and economy. Furthermore, the societal context, including uncertainties and the resulting complexity for actors, also emerged as a significant barrier.

Cooperation difficulties between established stakeholders are the most commonly described barrier in current urban freight research (Paper 2). These difficulties stem from unaligned interests and unclear gains for stakeholders. Lack of support from management and politicians for prioritizing cooperation accentuates this situation across both private and public sectors. The second most common barrier identified is a lack of system knowledge among stakeholders. This is often exacerbated by the fact that freight receives less attention than passenger transport, leaving local authorities without the necessary competence (Allen et al., 2014; Ballantyne et al., 2013).

The novel holistic picture of these stabilizing factors and their context, developed in Paper 2, enabled exploration of how they could be addressed effectively from a transition management perspective. Building on earlier research suggesting that holistic pictures can reveal insights into interconnections (Touboulic & Walker, 2015; Lagorio et al., 2016; Abbasi & Nilsson, 2012), our resulting model provides both an overall understanding of how the barriers are related and offers an order of priority for effectively addressing them. It might, for example, be necessary to prioritize political barriers before addressing economic barriers. These insights informed our analysis of how city administrations govern their urban freight systems, which is discussed in the next section.

Governance in small and medium-sized cities

While urban research often focuses on large cities, small and medium-sized cities are prevalent in Europe (Bell & Jayne, 2009; Eurostat, 2024), making their governance approaches a relevant field of study (Christidis et al., 2024). This research combines insights from a transition governance framework developed in Paper 3 and studies of barriers to transition (Papers 1 and 2) to analyze the governance activities of sustainability-concerned, logistically prominent small and medium-sized cities (Paper 4).

The results reveal a gap between the ideal comprehensive and coherent governance approaches and current practices. The transition governance perspective structures governance activities into strategic, tactical, operational, and monitoring functions, all designed to destabilize the status quo and enable a transition. The studied cities, however, exhibit fragmented resources and a focus on techno-rational aspects in their governance, for example, supporting innovation projects or providing basic infrastructure. This aligns well with existing literature noting limited resources and complexity coming from political dimensions, the balancing of interests, and stakeholder cooperation as key challenges for local administrations attempting to govern the development of urban freight systems (Ballantyne et al., 2013; Hansson et al., 2023; Browne et al., 2023; Churchman & Longhurst, 2022). According to

Shrestha et al. (2024), city authorities tended to focus on less demanding, technological aspects of governance rather than more demanding, yet more effective organization-oriented and political approaches.

Several cities' governance lacks essential elements, such as the creation of arenas for cooperation, political dedication to urban freight development, and systematic knowledge acquisition, required for effective transition governance. More demanding approaches involving political and organizational dimensions were exceptions. These results suggest that governing urban freight toward sustainability is not yet a top priority for local politicians, despite stated sustainability commitments at the city level. The current activity packages are generally neither comprehensive nor coherent enough to effectively steer the development toward a sustainable transition.

Impact of resources and activities on transition capability

This research suggests that while comprehensive and coherent governance activities are necessary to shape urban freight systems, they demand resources that are currently unavailable within the studied city administrations. This lack of resources directly translates to a lower capability to manage radical system transitions. We thereby see a risk similar to that identified by Nagorny-Koring and Nocht (2018), who state that transition governance can become ineffective at overcoming the challenges of transitions.

Fragmented governance efforts risk hampering city administrations' capabilities to govern transitions effectively. Comprehensive and coherent packages of governance activities offer city administrations opportunities to shape their urban freight systems in a transition. This is because such approaches create prerequisites, build capabilities, support implementation, and monitor the development of the systems. Comprehensive governance approaches, however, are demanding for small and medium-sized city administrations.

Coordinated transition efforts with other cities and governance levels can therefore be a way to both share the burden of a transition and increase the impact. City-level governance involves a mandate for local development that is inherently limited by geographical boundaries (Rosales, 2024; Shrestha et al., 2024; Plazier et al., 2024). This limitation means that even comprehensive local efforts may be insufficient to incentivize large-scale market adaptations. This is particularly critical for small and medium-sized cities, which lack the market attractiveness of larger urban centers. It makes it important, especially for small and medium-sized cities, to cooperate with peer cities and across governance levels to expand mandates and harmonize

requirements for freight markets large enough to provide actors in these freight systems with the necessary incentives and opportunities to adapt to new requirements.

Coordination is essential to effectively use cities' resources and extend their influence beyond city limits. Initiatives such as the Viable Cities network and the EU cities mission (Viable Cities, 2024; European Commission, 2024b) could offer opportunities to harmonize requirements across larger economic areas. Organizations such as The Swedish Association of Local Authorities and Regions could likely contribute to coordinating such efforts. This coordination can create incentives and necessary market pressure to force stakeholders to adapt, regardless of individual preferences, a mechanism more important for smaller cities than for large cities, which can leverage their market power alone.

This points to the crucial insight that policymakers and politicians at other governance levels can significantly support urban freight transitions. Since urban freight systems are interconnected and co-evolve with other societal systems, policymakers at regional, national, or EU levels can support local transitions. They achieve this by implementing their own complementary transition governance and by providing conditions favorable to transitioning local urban freight systems (e.g., supporting national policies, political dedication, and creating economic conditions). This multi-level approach is essential to address the systemic barriers identified in Papers 1 and 2.

Conclusions

The research presented in this thesis addresses the possibilities for small and medium-sized cities to govern their urban freight systems to transition toward sustainability. These possibilities are explored and described through the combination of four studies. Three questions guided the research concerning 1) barriers to change in urban freight systems; 2) small and medium-sized city administrations' transition governance; and 3) how resources and activities for governance affect this type of city administration's capabilities to manage a transition. The results are summarized in the following sections.

Key findings

This research developed a socio-technical transition perspective on urban freight systems, providing a holistic framework for understanding transitions toward sustainability. This perspective structures previously fragmented knowledge about urban freight into a coherent view of urban freight systems operating within a multi-layered societal context.

Understanding barriers as stabilizing factors

Transitions toward sustainability in urban freight systems constitute structural changes driven by multiple interconnected and co-evolving factors. This research identified and categorized 11 categories of factors across technical, economic, political, and organizational domains that function as stabilizing forces within urban freight systems and thereby act as barriers to radical change. The most prevalent barriers include difficulties in stakeholder cooperation and a lack of system knowledge among actors. Critically, these barriers are interrelated, and the research provides an order of priority for addressing them effectively, from strategic through operational levels, representing an advancement in transition governance thinking for urban freight systems.

Gaps in current governance practices

Analysis of sustainability-concerned, logistically prominent small and medium-sized cities reveals a significant gap between comprehensive transition governance requirements and current practices. The studied cities exhibit fragmented resources and predominantly focus on less demanding, techno-rational governance activity aspects, such as supporting innovation or providing basic infrastructure. Essential but more demanding governance elements, particularly political and organizational dimensions required for effective transition governance, are largely absent. This suggests that governing urban freight toward sustainability is not yet a top priority for local politicians, despite stated city-level sustainability commitments.

Resource constraints limit transition capability

The lack of resources and the fragmented nature of governance approaches for urban freight directly constrain the city administrations' capability to govern the development of urban freight systems toward radical system transitions. Beyond high-level visions, cities' strategic and tactical governance activities remain severely underdeveloped. When crucial elements such as purposive network extension and systematic knowledge accumulation are neglected, the overall effectiveness of governance is compromised, hindering the development of transition capability.

Multi-level and cross-border coordination is essential

This research demonstrates that urban freight systems are fundamentally interconnected with other societal systems, creating both challenges and opportunities. The geographically limited mandate of individual city administrations, particularly acute for small and medium-sized cities lacking market power, necessitates both vertical and horizontal coordination, for example, across governance levels and city borders. Policymakers at regional, national, and EU levels can support local transitions through complementary governance activities, harmonized requirements across larger economic areas, and other favorable transition conditions. Such multi-level and cross-border coordination can create the necessary market pressures and incentives that individual cities cannot generate on their own.

Contributions and implications

This research contributes valuable insights by combining empirical urban freight data with a socio-technical transition governance lens, adding analytical power

previously unavailable in urban freight literature. While transition governance frameworks offer useful tools for practical design and theoretical insight, their application in local city contexts remains relatively new (Nagorny-Koring & Nochta, 2018), underscoring the originality of this research.

Theoretical contributions

This research advances the theoretical understanding of transitions in urban freight logistics systems in small and medium-sized cities in three significant ways.

First, it develops and applies a novel socio-technical transition perspective specifically for urban freight systems (Paper 3). By integrating the multi-level perspective (Geels, 2011) with transition management approaches (Loorbach, 2010; Frantzeskaki et al., 2012), the research provides a comprehensive analytical framework that explicates the interconnected nature of dimensions within urban freight systems and their multi-layered societal contexts. This perspective moves beyond the predominantly techno-economic focus in existing urban freight literature toward a more holistic socio-technical understanding. It also highlights the analytical utility of socio-technical transition theory within the domain of urban freight, thereby extending the theoretical boundaries of the framework.

Second, the research synthesizes and reconceptualizes fragmented knowledge of barriers to change in urban freight systems. This research reframes the previously isolated barriers (Nordtømme et al., 2015; Van Duin et al., 2018) to interrelated stabilizing factors within an established complex system. The identification of 11 barrier categories, their interrelations, and a priority order for addressing them from strategic through operational levels represents an advancement in theory from an urban freight transition management perspective.

Third, the research provides new empirical and theoretical insights into transition governance in small and medium-sized cities, an understudied context in urban literature. The findings reveal governance gaps and resource constraints that limit city administrations' transition governance capability and contribute to a broader understanding of the specificities of small and medium-sized cities, their transition governance effectiveness, and their possibilities to steer and manage transitions.

Practical contributions

The research delivers several practical tools and frameworks that practitioners can apply. The primary practical contribution is the analytical transition governance framework developed in Paper 4, which integrates transition governance functions (strategic, tactical, operational, and monitoring) with the holistic perspective on barriers and their interrelations (Paper 2). This framework provides both diagnostic and prescriptive value, enabling city administrations and other stakeholders to

systematically analyze their current governance practices, identify gaps, and develop more comprehensive approaches to governing urban freight transitions. The framework can have a specific value for small and medium-sized cities that lack extensive resources and specialized competence in urban freight transition governance.

The socio-technical transition perspective on urban freight systems (Paper 3) and the transition governance activity visualizations (Paper 4) provide transition managers with tools to communicate about urban freight system transitions and their governance and support the development of a shared understanding about urban freight transitions among stakeholders. The integrated framework also offers value for logistics and transport companies, for example, by clarifying how different factors interact in a transition process. This enables firms to better assess when and where to engage, to prioritize transition-related activities, and to ensure that planned initiatives have appropriate strategic and organizational prerequisites. The framework thereby reduces uncertainty and supports more informed resource allocation. Moreover, the insights from this research may stimulate commercial actors to develop new business models, services, and collaborative roles linked to sustainable urban freight transitions.

Policy implications

This research has significant implications for policymakers at multiple governance levels. For local policymakers and politicians in small and medium-sized cities, the findings reveal that current urban freight governance approaches are insufficient for managing transitions toward sustainability. The research demonstrates that without adequate resources, political prioritization, and comprehensive governance structures, city administrations cannot effectively build the transition capabilities necessary to destabilize the factors resisting radical change in these systems, even when high-level sustainability commitments exist. This suggests that political leadership must elevate urban freight transition governance on local policy agendas and allocate the necessary resources for comprehensive, coherent governance approaches.

For regional, national, and EU-level policymakers, the research highlights critical roles in supporting local transitions. The geographically limited mandate and market power of individual cities, particularly small and medium-sized ones, necessitate supportive conditions from higher levels of governance. Policymakers can facilitate local transitions through their own complementary transition governance activities, long-term requirements, support for coordination across governance levels and between cities, and by providing supportive regulatory frameworks.

The research also underscores the importance of cross-sectoral policy integration and coordination. Since urban freight systems are fundamentally interconnected

with other societal systems, effective policy must coordinate urban freight-related measures with other policy areas such as energy, sustainability, and planning. By identifying and structuring the factors affecting urban freight system transitions toward sustainability, this research provides policymakers with proposals for effective transition governance in support of urban freight transitions.

A key outcome is the development of a refined, practical framework integrating transition governance functions (strategic, tactical, operational, and monitoring) with identified system barriers. This framework enables cities to systematically analyze and develop their urban freight governance practices from a transition perspective, providing both diagnostic and prescriptive value for practitioners and policymakers.

Limitations

Beyond the design reflections discussed in Chapter 3, this research has limitations related to scope, context, and the interpretive nature of the framework development.

Geographical and contextual scope

The empirical findings from Studies 1, 3, and 4 build on data from Swedish cities and their urban freight systems, making the results geographically and culturally bounded. While Studies 1 and 3 included diverse stakeholder perspectives, all respondents operated within the Swedish context. The governance structures, culture, regulatory frameworks, and market conditions may limit generalizability to cities and freight systems operating under substantially different conditions. In Study 4, six small and medium-sized city administrations were analyzed through semi-structured interviews. While the number of respondents within each city organization is limited, this reflects the organizational reality of urban freight governance. The units dealing with freight in these cities are themselves small, so additional respondents would not necessarily enhance data quality or provide substantially different perspectives. Studies in different geographical and cultural contexts could test the applicability of the developed frameworks and further detail how governance approaches affect urban freight system transitions across varying institutional settings.

Framework construction and theoretical choices

While the design reflections address methodological considerations, specific aspects of framework development deserve consideration. The various frameworks developed in this research represent theoretical constructs based on the synthesis of

existing scholarly work applied to an urban freight system context. While grounded in established theory, these resulting frameworks reflect the researchers' conceptual and analytical choices. Other researchers working with the same materials might configure these differently. The frameworks must thus ultimately be evaluated through application and further empirical testing in diverse contexts.

Temporal and comparative scope

This research captures governance practices and stakeholder perspectives at specific points in time rather than tracking longitudinal development. This temporal limitation means that insights into how transition capabilities and governance approaches evolve as cities gain experience and exert transition governance, or how stakeholder attitudes and cooperation patterns develop over time, remain unexplored.

These limitations highlight several avenues for future research, which are discussed in the next section.

Future research

This research opens several promising avenues for future inquiry, here organized from extensions of the current work to broader, long-term research opportunities.

Studying small and medium-sized city administrations' governance of urban freight systems in other geographical and cultural contexts would enhance understanding of how institutional, regulatory, and cultural factors influence the effectiveness of transition governance. Comparative studies across different European regions or beyond Europe could reveal context-specific barriers and enablers, testing the generalizability and applicability of the frameworks developed in this research. Such studies could also explore whether the identified priority order for addressing barriers holds across different contexts or requires adaptation based on local conditions.

Continued exploration of governance approaches in similar cities could identify the most effective configurations of governance activities from a transition perspective. Longitudinal studies tracking cities as they develop their governance practices would be particularly valuable for understanding how transition capabilities evolve, which interventions prove most effective, and how cities learn from experience. Additionally, research on methods for assessing the transition impact potential of new ideas and solutions could assist cities in allocating their limited resources to projects that offer the greatest effect from a transition perspective, thereby addressing the resource constraints identified in this research.

Since the possibilities for individual city administrations to steer freight development are limited, exploring multi-level transition governance represents a critical research need. Future studies could investigate how regional, national, and EU-level governance can be effectively combined with local transition governance for urban freight. These could examine coordination mechanisms, division of responsibilities, political dimensions, and synergies between governance levels. This research direction is particularly important for small and medium-sized cities that lack the market power to create necessary change pressures independently. Questions about the optimal governance level for different types of interventions, mechanisms for harmonizing requirements across larger economic areas, and strategies for building effective guiding coalitions across governance levels are all relevant paths for investigations.

A critical gap in current knowledge concerns how progress in urban freight system transitions can be measured and evaluated. Future research should develop frameworks and indicators to monitor transition progress, learn from experience, and adjust governance approaches accordingly. This includes identifying meaningful indicators, manageable for small and medium-sized cities, that capture transition progress and enable adjustments in the transition governance.

Based on the insights from this research, future work should continue exploring and combining theoretical frameworks to generate new insights into transition governance for urban freight systems. This includes adapting and testing the frameworks developed here in different contexts and for different types of urban systems facing similar sustainability challenges.

In a broader perspective, the sustainability of forecasted growth in urban freight demand itself warrants critical examination. Since this demand grows with expanding urban economies and consumption patterns, research exploring how urban freight demand itself can be shaped toward sustainability, rather than merely making existing demand patterns less harmful, represents a fundamental long-term research need. This includes exploring alternative consumption models that reduce freight demand while maintaining or enhancing the quality of life, as well as the governance needed for these transitions.

References

- Abbasi, M. & Nilsson, F. 2012. Themes and challenges in making supply chains environmentally sustainable. *Supply Chain Management: An International Journal*, 17, 517-530.
- Akgün, E. Z., Monios, J., Rye, T. & Fonzone, A. 2019. Influences on urban freight transport policy choice by local authorities. *Transport Policy*, 75, 88-98.
- Alford, J. & Head, B. W. 2017. Wicked and less wicked problems: a typology and a contingency framework. *Policy and Society*, 36, 397-413.
- Aljohani, K. & Thompson, R. G. 2018. A stakeholder-based evaluation of the most suitable and sustainable delivery fleet for freight consolidation policies in the inner-city area. *Sustainability (Switzerland)*, 11.
- Allen, J., Ambrosini, C., Browne, M., Patier, D., Routhier, J.-L. & Woodburn, A. 2014. Data Collection for Understanding Urban Goods Movement. In: Gonzalez-Feliu, J., Semet, F. & Routhier, J.-L. (eds.) *Sustainable Urban Logistics: Concepts, Methods and Information Systems*. Berlin, Heidelberg: Springer Berlin Heidelberg.
- Amaya, J., Delgado-Lindeman, M., Arellana, J. & Allen, J. 2021. Urban freight logistics: What do citizens perceive? *Transportation Research Part E: Logistics and Transportation Review*, 152, 102390.
- Anderson, S., Allen, J. & Browne, M. 2005. Urban logistics—how can it meet policy makers' sustainability objectives? *Journal of Transport Geography*, 13, 71-81.
- Arnold, R. D. & Wade, J. P. 2015. A Definition of Systems Thinking: A Systems Approach. *Procedia Computer Science*, 44, 669-678.
- Baker, D., Briant, S., Hajirasouli, A., Yigitcanlar, T., Paz, A., Bhaskar, A., Corry, P., Whelan, K., Donehue, P. & Parsons, H. 2023. Urban freight logistics and land use planning education: Trends and gaps through the lens of literature. *Transportation Research Interdisciplinary Perspectives*, 17, 100731.
- Ballantyne, E. E. F., Lindholm, M. & Whiteing, A. 2013. A comparative study of urban freight transport planning: addressing stakeholder needs. *Journal of Transport Geography*, 32, 93-101.
- Balm, S., Amstel, W. P. V., Habers, J., Aditjandra, P. & Zunder, T. H. 2016. The Purchasing Behavior of Public Organizations and its Impact on City Logistics. *Transportation Research Procedia*, 12, 252-262.
- Bandeira, R. a. M., D'agosto, M. A., Ribeiro, S. K., Bandeira, A. P. F. & Goes, G. V. 2018. A fuzzy multi-criteria model for evaluating sustainable urban freight transportation operations. *Journal of Cleaner Production*, 184, 727-739.

- Behrends, S., Lindholm, M. & Woxenius, J. 2008. The Impact of Urban Freight Transport: A Definition of Sustainability from an Actor's Perspective. *Transportation Planning and Technology*, 31, 693-713.
- Bell, D. & Jayne, M. 2009. Small Cities? Towards a Research Agenda. *International Journal of Urban and Regional Research*, 33, 683-699.
- Bjørgen, A., Bjerkan, K. Y. & Hjelkrem, O. A. 2019. E-groceries: Sustainable last mile distribution in city planning. *Research in Transportation Economics*.
- Bjørgen, A. & Ryghaug, M. 2022. Integration of urban freight transport in city planning: Lesson learned. *Transportation Research Part D: Transport and Environment*, 107, 103310.
- Björklund, M. & Gustafsson, S. 2015. Toward sustainability with the coordinated freight distribution of municipal goods. *Journal of Cleaner Production*, 98, 194-204.
- Björklund, M. 2018. *Hållbara logistiksystem., uppl 2*.
- Boudoin, D., Morel, C. & Gardat, M. 2014. Supply Chains and Urban Logistics Platforms. In: Gonzalez-Feliu, J., Semet, F. & Routhier, J.-L. (eds.) *Sustainable Urban Logistics: Concepts, Methods and Information Systems*. Berlin, Heidelberg: Springer Berlin Heidelberg.
- Boverket 2024. Godstransporter. 2024-11-26 ed. Boverket.se: Boverket.
- Bridges, A. 2016. The role of institutions in sustainable urban governance. *Natural Resources Forum*, 40, 169-179.
- Browne, M., Goodchild, A., Marcucci, E., Gatta, V. & Le Pira, M. 2023. Handbook on City Logistics and Urban Freight. *Chapter 15: Overview on stakeholder engagement*. Edward Elgar Publishing.
- Browne, M., Mcleod, S. & Woxenius, J. 2024. Chapter Three - Advancing regional freight planning: A strategic policy perspective. In: Tavasszy, L., Browne, M. & Piecyk, M. (eds.) *Advances in Transport Policy and Planning*. Academic Press.
- Bryman, A. & Bell, E. 2017. *Företagsekonomiska forskningsmetoder*, Liber.
- Bryson, J. M. 1988. A strategic planning process for public and non-profit organizations. *Long Range Planning*, 21, 73-81.
- Buldeo Rai, H., Van Lier, T., Meers, D. & Macharis, C. 2017. Improving urban freight transport sustainability: Policy assessment framework and case study. *Research in Transportation Economics*, 64, 26-35.
- Butrina, P., Giron-Valderrama, G. D. C., Machado-Leon, J. L., Goodchild, A. & Ayyalasomayajula, P. C. 2017. From the Last Mile to the Last 800 ft Key Factors in Urban Pickup and Delivery of Goods. *Transportation Research Record*, 85-92.
- Cherp, A., Vinichenko, V., Jewell, J., Brutschin, E. & Sovacool, B. 2018. Integrating techno-economic, socio-technical and political perspectives on national energy transitions: A meta-theoretical framework. *Energy Research & Social Science*, 37, 175-190.
- Christidis, P., Ulpiani, G., Stepniak, M. & Vettters, N. 2024. Research and innovation paving the way for climate neutrality in urban transport: Analysis of 362 cities on their journey to zero emissions. *Transport Policy*, 148, 107-123.

- Churchman, P. & Longhurst, N. 2022. Where is our delivery? The political and socio-technical roadblocks to decarbonising United Kingdom road freight. *Energy Research & Social Science*, 83, 102330.
- Corbin, J. M. & Strauss, A. L. 2008. Basics of Qualitative Research (3rd ed.): Techniques and Procedures for Developing Grounded Theory. Thousand Oaks, California: SAGE Publications, Inc.
- Cui, J., Dodson, J. & Hall, P. V. 2015. Planning for Urban Freight Transport: An Overview. *Transport Reviews*, 35, 583-598.
- David, F. R. & David, F. R. 2017. *Strategic management : concepts and cases : a competitive advantage approach*, Harlow, Pearson.
- De Abreu, V. H. S., De Assis, T. F., De Carvalho Neto, D. D. & De Almeida D'agosto, M. 2026. How Can the Implementation of Best Sustainable Practices in the Urban Freight Transport Sector Help the Logistics Sector Achieve Sustainable Development Goals? In: Muthu, S. S. (ed.) *Energy Efficiency and Carbon Footprint Assessment : Case Studies*. Cham: Springer Nature Switzerland.
- De Carvalho, P. P. S., De Araújo Kalid, R., Rodríguez, J. L. M. & Santiago, S. B. 2019. Interactions among stakeholders in the processes of city logistics: a systematic review of the literature. *Scientometrics*, 120, 567-607.
- Dijkstra, L. & Poelman, H. 2012. Cities in Europe: the new OECD-EC definition. *Regional focus*, 1, 1-13.
- Docherty, I., Marsden, G. & Anable, J. 2018. The governance of smart mobility. *Transportation Research Part A: Policy and Practice*, 115, 114-125.
- Dutton, J. E. & Duncan, R. B. 1987. The Influence of the Strategic Planning Process on Strategic Change. *Strategic Management Journal*, 8, 103-116.
- Edmondson, D. L., Kern, F. & Rogge, K. S. 2019. The co-evolution of policy mixes and socio-technical systems: Towards a conceptual framework of policy mix feedback in sustainability transitions. *Research Policy*, 48, 103555.
- Ehrler, V. C., Schöder, D. & Seidel, S. 2019. Challenges and perspectives for the use of electric vehicles for last mile logistics of grocery e-commerce – Findings from case studies in Germany. *Research in Transportation Economics*.
- European Commission. 2024a. *The European Green Deal* [Online]. Directorate-General for Communication. Available: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en [Accessed 2025-05-23].
- European Commission. 2025. *Transport Decarbonization* [Online]. European Commission, Available: https://climate.ec.europa.eu/eu-action/transport-decarbonisation_en [Accessed 2025-09-16].
- European Commission 2024b. EU missions – 100 climate-neutral and smart cities. In: Directorate-General for Research and Innovation (ed.). Publications Office of the European Union,.
- European Commission 2023. Urban mobility. In: Mobility and Transport (ed.). European Commission,.

- European Environment Agency 2023. Transport and Mobility.
<https://www.eea.europa.eu/en/topics/in-depth/transport-and-mobility>: European Environment Agency.
- Eurostat 2024. Population on 1 January by age groups and sex - cities and greater cities.
- Fossheim, K. & Andersen, J. 2017. Plan for sustainable urban logistics – comparing between Scandinavian and UK practices. *European Transport Research Review*, 9.
- Frantzeskaki, N., Loorbach, D. & Meadowcroft, J. 2012. Governing societal transitions to sustainability. *International Journal of Sustainable Development*, 15, 19-36.
- Gammelgaard, B. 2015. The emergence of city logistics: The case of Copenhagen's Citylogistik-kbh. *International Journal of Physical Distribution and Logistics Management*, 45, 333-351.
- Gammelgaard, B., Andersen, C. B. G. & Figueroa, M. 2017. Improving urban freight governance and stakeholder management: A social systems approach combined with relationship platforms and value co-creation. *Research in Transportation Business & Management*, 24, 17-25.
- Gatta, V., Marcucci, E. & Le Pira, M. 2017. Smart urban freight planning process: integrating desk, living lab and modelling approaches in decision-making. *European Transport Research Review*, 9.
- Geels, F. W. 2011. The multi-level perspective on sustainability transitions: Responses to seven criticisms. *Environmental Innovation and Societal Transitions*, 1, 24-40.
- Geels, F. W. 2012. A socio-technical analysis of low-carbon transitions: introducing the multi-level perspective into transport studies. *Journal of transport geography*, 24, 471-482.
- Geels, F. W. 2019. Socio-technical transitions to sustainability: a review of criticisms and elaborations of the Multi-Level Perspective. *Current Opinion in Environmental Sustainability*, 39, 187-201.
- Goetz, A. R. & Alexander, S. 2019. Urban Goods Movement and Local Climate Action Plans: Assessing Strategies to Reduce Greenhouse Gas Emissions from Urban Freight Transportation. *Mineta Transportation Institute Publications*.
- Haarstad, H., Rosales, R. & Shrestha, S. 2024. Freight logistics and the city. *Urban Studies*, 61, 3-19.
- Hansson, L., Marcucci, E., Gatta, V. & Le Pira, M. 2023. Handbook on City Logistics and Urban Freight. *Chapter 18: Urban freight transport and multi-level governance*. Edward Elgar Publishing.
- Hartl, R., Harms, P. & Egermann, M. 2024. Towards transformation-oriented planning: what can sustainable urban mobility planning (SUMP) learn from transition management (TM)? *Transport Reviews*, 44, 167-190.
- Hassan, A. M. & Lee, H. 2015. The paradox of the sustainable city: definitions and examples. *Environment, Development and Sustainability*, 17, 1267-1285.
- He, Z. 2020. The challenges in sustainability of urban freight network design and distribution innovations: a systematic literature review. *International Journal of Physical Distribution and Logistics Management*, 50, 601-640.

- Hodson, M. & Marvin, S. 2010. Can cities shape socio-technical transitions and how would we know if they were? *Research Policy*, 39, 477-485.
- Holguín-Veras, J., Amaya Leal, J., Sanchez-Diaz, I., Browne, M. & Wojtowicz, J. 2020. State of the art and practice of urban freight management Part II: Financial approaches, logistics, and demand management. *Transportation Research Part A: Policy and Practice*, 137, 383-410.
- Holtz, G., Xia-Bauer, C., Roelfes, M., Schüle, R., Vallentin, D. & Martens, L. 2018. Competences of local and regional urban governance actors to support low-carbon transitions: Development of a framework and its application to a case-study. *Journal of Cleaner Production*, 177, 846-856.
- Humphreys, R. M. & Dumitrescu, A. 2021. Decarbonizing the Freight and Logistics Sector. *Transport Decarbonization Investment Series*,. Washington, DC: World Bank.
- Hölscher, K., Wittmayer, J. M. & Loorbach, D. 2018. Transition versus transformation: What's the difference? *Environmental Innovation and Societal Transitions*, 27, 1-3.
- İmre, Ş., Çelebi, D. & Koca, F. 2021. Understanding barriers and enablers of electric vehicles in urban freight transport: Addressing stakeholder needs in Turkey. *Sustainable Cities and Society*, 68, 102794.
- International Transport Forum 2021. ITF Transport Outlook 2021. Paris: Organisation for economic co-operation and development (OECD).
- International Transport Forum 2023. ITF Transport Outlook 2023. Paris: Organisation for economic co-operation and development (OECD).
- Katsela, K. & Pålsson, H. 2019. A multi-criteria decision model for stakeholder management in city logistics. *Research in Transportation Business & Management*, 33, 100439.
- Kemp, R. & Loorbach, D. 2003. Governance for Sustainability Through Transition Management. *EAEPE 2003 Conference* Maastricht, the Netherlands
- Kervall, M. & Pålsson, H. 2022. Barriers to change in urban freight systems: a systematic literature review. *European Transport Research Review*, 14, 29.
- Kiba-Janiak, M. 2017. Urban freight transport in city strategic planning. *Research in Transportation Business and Management*, 24, 4-16.
- Kin, B., Verlinde, S., Mommens, K. & Macharis, C. 2017. A stakeholder-based methodology to enhance the success of urban freight transport measures in a multi-level governance context. *Research in Transportation Economics*, 65, 10-23.
- Kjaer, A. M. 2011. Rhodes' contribution to governance theory: praise, criticism and the future governance debate. *Public Administration*, 89, 101-113.
- Klijn, E.-H. & Koppenjan, J. 2012. Governance network theory: past, present and future. *Policy & Politics*, 40, 687-606.
- Kotter, J. P. 2012. *Leading change*, Harvard Business Review Press.
- Kotter, J. P. S., Leonard A. 2008. Choosing Strategies for Change. *Harvard Business Review*. <https://hbr.org/2008/07/choosing-strategies-for-change>: Harvard Business School Publishing.

- Köhler, J., Geels, F. W., Kern, F., Markard, J., Onsongo, E., Wieczorek, A., Alkemade, F., Avelino, F., Bergek, A., Boons, F., Fünfschilling, L., Hess, D., Holtz, G., Hyysalo, S., Jenkins, K., Kivimaa, P., Martiskainen, M., Mcmeekin, A., Mühlemeier, M. S., Nykvist, B., Pel, B., Raven, R., Rohrer, H., Sandén, B., Schot, J., Sovacool, B., Turnheim, B., Welch, D. & Wells, P. 2019. An agenda for sustainability transitions research: State of the art and future directions. *Environmental Innovation and Societal Transitions*, 31, 1-32.
- Lagorio, A., Pinto, R. & Golini, R. 2016. Research in urban logistics: a systematic literature review. *International Journal of Physical Distribution & Logistics Management*, 46, 908-931.
- Landsbygds- Och Infrastrukturdepartementet 2010. Plan- och bygglag (2010:900). In: Bb, L.-O. I. S. (ed.) SFS 2025:1079 ed. <https://www.riksdagen.se/>: Landsbygds- och infrastrukturdepartementet SPN BB.
- Lawani, A. 2020. Critical realism: what you should know and how to apply it. *Qualitative Research Journal*, 21, 320-333.
- Le Pira, M., Giuffrida, N. & Paddeu, D. 2024. Chapter Four - Research and practice of stakeholder engagement in freight transport planning. In: Tavasszy, L., Browne, M. & Piecyk, M. (eds.) *Advances in Transport Policy and Planning*. Academic Press.
- Lebeau, P., Macharis, C., Van Mierlo, J. & Lebeau, K. 2015. Electrifying light commercial vehicles for city logistics? A total cost of ownership analysis. *European Journal of Transport and Infrastructure Research*, 15, 551-569.
- Lindawati, Van Schagen, J., Goh, M. & De Souza, R. 2014. Collaboration in urban logistics: Motivations and barriers. *International Journal of Urban Sciences*, 18, 278-290.
- Lindholm, M. 2010. A sustainable perspective on urban freight transport: Factors affecting local authorities in the planning procedures. *Procedia - Social and Behavioral Sciences*, 2, 6205-6216.
- Lindholm, M. & Behrends, S. 2012. Challenges in urban freight transport planning – a review in the Baltic Sea Region. *Journal of Transport Geography*, 22, 129-136.
- Lindholm, M. & Browne, M. 2013. Local Authority Cooperation with Urban Freight Stakeholders: A Comparison of Partnership Approaches. *European Journal of Transport and Infrastructure Research*, 13.
- Liu, S., Xu, J., Shi, X., Li, G. & Liu, D. 2018. Sustainable Distribution Organization Based on the Supply-Demand Coordination in Large Chinese Cities. *Sustainability*, 10.
- Loorbach, D. 2010. Transition Management for Sustainable Development: A Prescriptive, Complexity-Based Governance Framework. *Governance*, 23, 161-183.
- Löfstrand, S., Hellgren, J., Thulin, N., Engdahl, H., Pettersson, S., Williamsson, J. & Sandoff, A. 2013. Feasibility of Electrifying Urban Goods Distribution Trucks. *SAE International Journal of Commercial Vehicles*, 6, 24-33.
- Macharis, C. & Milan, L. 2015. Transition through dialogue: A stakeholder based decision process for cities: The case of city distribution. *Habitat International*, 45, 82-91.
- Mcmillan, C. & Overall, J. 2016. Wicked problems: turning strategic management upside down. *Journal of Business Strategy*, 37, 34-43.

- Melander, L., Nyquist-Magnusson, C. & Wallström, H. 2022. Drivers for and barriers to electric freight vehicle adoption in Stockholm. *Transportation Research Part D: Transport and Environment*, 108, 103317.
- Meyer, T. 2020. Decarbonizing road freight transportation – A bibliometric and network analysis. *Transportation Research Part D: Transport and Environment*, 89, 102619.
- Miles, M. B., Huberman, A. M. & Saldaña, J. 2020. *Qualitative data analysis : a methods sourcebook*, Los Angeles, SAGE.
- Moen, O. 2014. Co-distribution of Municipal Goods in Sweden – Procurement from a New Standpoint. *Procedia - Social and Behavioral Sciences*, 125, 484-495.
- Moloney, S. & Horne, R. 2015. Low Carbon Urban Transitioning: From Local Experimentation to Urban Transformation? *Sustainability*, 7, 2437-2453.
- Nagorny-Koring, N. C. & Nocht, T. 2018. Managing urban transitions in theory and practice - The case of the Pioneer Cities and Transition Cities projects. *Journal of Cleaner Production*, 175, 60-69.
- Nordtømme, M. E., Bjerkan, K. Y. & Sund, A. B. 2015. Barriers to urban freight policy implementation: The case of urban consolidation center in Oslo. *Transport Policy*, 44, 179-186.
- Paddeu, D., Parkhurst, G., Fancello, G., Fadda, P. & Ricci, M. 2018. Multi-stakeholder collaboration in urban freight consolidation schemes: Drivers and barriers to implementation. *Transport*, 33, 913-929.
- Paddeu, D., Parkhurst, G., Rosenberg, G., Carhart, N. & Taylor, C. 2024. Promoting sustainable urban freight through stakeholder engagement to co-create decarbonisation pathways in the UK. *Research in Transportation Economics*, 104, 101424.
- Plazier, P., Rauws, W., Neef, R. & Buijs, P. 2024. Towards sustainable last-mile logistics? Investigating the role of cooperation, regulation, and innovation in scenarios for 2035. *Research in Transportation Business & Management*, 56, 101198.
- Pålsson, H. & Johansson, O. 2016. Reducing transportation emissions: Company intentions, barriers and discriminating factors. *Benchmarking: An International Journal*, 23, 674-703.
- Quak, H. & Kin, B. 2024. Reorganizing city logistics to reduce urban movements – Experiences with hubs and decoupling inner and outer urban transport. *Transportation Research Procedia*, 79, 36-43.
- Rhodes, R. a. W. 2007. Understanding Governance: Ten Years On. *Organization Studies*, 28, 1243-1264.
- Rosales, R. 2024. Is it enough to enable freight? Modes of governance for urban logistics in Norway. *European Planning Studies*, 32, 2473-2492.
- Schliwa, G., Armitage, R., Aziz, S., Evans, J. & Rhoades, J. 2015. Sustainable city logistics - Making cargo cycles viable for urban freight transport. *Research in Transportation Business and Management*, 15, 50-57.
- Schot, J., Kanger, L. & Verbong, G. 2016. The roles of users in shaping transitions to new energy systems. *Nature Energy*, 1, 16054.

- Shrestha, S., Haarstad, H. & Rosales, R. 2024. Power in urban logistics: A comparative analysis of networks and policymaking in logistics sustainability governance. *Environmental Innovation and Societal Transitions*, 51, 100845.
- Shrestha, S., Haarstad, H., Rauws, W. & Buijs, P. 2025. From experiments to organizational change: Learning from urban logistics projects in Groningen and Bergen. *Technological Forecasting and Social Change*, 213, 124023.
- Smith, M. 2020. Delivering the goods: executing sustainable transport policy through urban planning in Merseyside (2001–2010). *Planning Perspectives*.
- Snyder, H. 2019. Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333-339.
- Squires, A., Wade, J., Dominick, P. & Gelosh, D. 2011. Building a competency taxonomy to guide experience acceleration of lead program systems engineers. Stevens Institute of Technology, School of Systems and Enterprises, Hoboken NJ.
- Stockholm Resilience Centre. 2016. *How food connects all the SDGs* [Online]. Available: <https://www.stockholmresilience.org/research/research-news/2016-06-14-how-food-connects-all-the-sdgs.html> [Accessed 2025-04-15].
- Taniguchi, E. & Thompson, R. G. 2015. *City logistics : mapping the future*, CRC Press.
- Touboulie, A. & Walker, H. 2015. Theories in sustainable supply chain management: a structured literature review. *International Journal of Physical Distribution & Logistics Management*, 45, 16-42.
- Tranfield, D., Denyer, D. & Smart, P. 2003. Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review. *British Journal of Management*, 14, 207-222.
- Tukker, A. & Butter, M. 2007. Governance of sustainable transitions: about the 4(0) ways to change the world. *Journal of Cleaner Production*, 15, 94-103.
- Van Duin, R., Slabbekoorn, M., Tavasszy, L. & Quak, H. 2018. Identifying dominant stakeholder perspectives on urban freight policies: A q-analysis on urban consolidation centres in The Netherlands. *Transport*, 33, 867-880.
- Viable Cities. 2024. *Together for climate-neutral cities* [Online]. <https://viablecities.se/en/>: Viable Cities. Available: <https://viablecities.se/en/> [Accessed 2026-02-04].
- Visser, J. 2014. Role of the public sector. *City Logistics. Mapping The Future*, 25-40.
- Waseem, N. & Kota, S. Sustainability definitions—An analysis. *Research into Design for Communities*, Volume 2: Proceedings of ICoRD 2017, 2017. Springer, 361-371.
- Watson, T. J. 1994. Managing, Crafting and Researching: Words, Skill and Imagination in Shaping Management Research. *British Journal of Management*, 5, 77.
- Williamsson, J. & Moen, O. 2022. Barriers to business model innovation in the Swedish urban freight transport sector. *Research in Transportation Business & Management*, 45, 100799.
- Yin, R. K. 2014. *Case study research : design and methods*, SAGE.