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Transformative planning capacities in the transformative change of mobility systems

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Abstract

There is increasing urgency to tackle the ongoing climate crisis. New innovations, policies, tools and changes in habits related to our transport systems, especially the need to decrease people's car dependency, are necessary. Recently, the redesign of city planning through urban experimentation to reduce car dependency has become a common planning tool in many cities. This paper addresses how Swedish municipalities are implementing innovations in transport and mobility through urban experimentation and their work with mobility hubs. Importantly, we wanted to understand the ways in which the municipalities are working with urban experiments towards transformative change and how local authorities are increasingly applying experimental governance approaches. Our empirical material builds on interviews and workshops with local officials and planners, and an analysis of policy documents in the municipalities. Our results show that the influence of local conditions and the planning environment matters for how transformative planning is practised. Communication around future visions and goals is an important aspect of implementing new tools for change. The implementation of new innovations in the mobility sector may require new governance models to achieve more consistent planning tools and challenge existing norms and structures.

Keywords: Transformative planning capacities ▪ Transformative change ▪ Mobility systems

Transformative Planungskapazitäten im transformativen Wandel der Mobilitätssysteme

Zusammenfassung

Es gibt eine zunehmende Dringlichkeit, die anhaltende Klimakrise zu bewältigen. Neue Innovationen, Politiken, Werkzeuge und Verhaltensänderungen im Zusammenhang mit unseren Transportsystemen, insbesondere die Notwendigkeit, die Abhängigkeit der Menschen vom Auto zu verringern, sind notwendig. In jüngster Zeit ist die Neugestaltung der Stadtplanung durch städtebauliche Experimente zur Reduzierung der Autoabhängigkeit in vielen Städten zu einem gängigen Planungsinstrument geworden. Dieser Beitrag behandelt, wie schwedische Gemeinden Innovationen im Transport- und Mobilitätsbereich durch urbane Experimente umsetzen, und zeigt ihre Arbeit mit Mobilitätshubs. Vor allem wollten wir verstehen, wie die Gemeinden mit urbanen Experimenten hin zu transformativen Veränderungen arbeiten. Unser empirisches Material basiert auf Interviews und Workshops mit Gemeindevertretern und Planern sowie einer Analyse von Strategiepapieren in den Gemeinden. Unsere Ergebnisse zeigen, dass der Einfluss lokaler Bedingungen und des Planungsumfelds wichtig dafür ist, wie transformative Planung praktiziert wird. Die Kommunikation über zukünftige Visionen und Ziele ist ein wichtiger Aspekt bei der Implementierung neuer Instrumente für den Wandel. Die Umsetzung neuer Innovationen im Mobilitätssektor erfordert möglicherweise neue Governance-Modelle, um konsistentere Planungsinstrumente zu erreichen und bestehende Normen und Strukturen infrage zu stellen.

Schlüsselwörter: Transformative Planungskapazitäten ▪ Transformativer Wandel ▪ Mobilitätssysteme

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1 Introduction

Climate change and environmental degradation are two of the major challenges facing our society. To meet these challenges and achieve the goal of reaching net-zero greenhouse gas emissions by 2045, fundamental and radical changes in structures, systems and norms within the built environment and the transport systems are necessary. There is a consensus that such challenges cannot simply be tackled with current mindsets of traditional planning approaches, which are often rigid and static (Albrechts/Barbanete/Monno 2020: 1). This means that there is a need to change current planning and decision-making practices (Healey 2009: 441; Albrechts 2010: 1116) to steer urban development to meet both local and international sustainability goals (McCormick/Anderberg/Coenen et al. 2013: 1). The concept of transformative planning is a response to various societal challenges, the need for planning to adopt a governing role and the impacts of planning processes (Lukkarinen/Nieminen/Lazarevic 2023: 57–58). Unlike traditional planning, transformative planning is directed towards more proactive and innovative practices (Albrechts 2010: 1118; Albrechts/Barbanete/Monno 2020: 2). A transformation perspective emphasizes the need for radical and systemic change to overcome sustainability issues in the long term (Hölscher/Frantzeskaki/Loorbach 2019a: 793) and requires planners to envision a future that is radically and structurally different from the present (Albrechts/Barbanete/Monno 2020: 2).

Particularly, the transport sector is marked by significant inertia, lock-ins and path dependencies that influence the development of new technologies, infrastructures, social practices and the processes of planning and decision-making. In response, there has been an increasing focus on the implementation of new technologies in the transport sector to address climate and sustainability challenges. Given this context, research and policy in transportation have shown significant interest in experimental governance methods and their potential impact on climate and sustainability transformation. There has hence been a rise in pilots, demonstration projects, organizational innovation platforms, testbeds and other experimental practices within the transport sector (Mukhtar-Landgren/Paulsson 2021: 137; Wallsten/Henriksson/Isaksson 2021: 538; Witzell/Henriksson/Håkansson et al. 2022: 721). At the same time, few planning practices include sufficient strategies and tools to evaluate the social, organizational and technological consequences of supporting sustainable and inclusive innovations in the transport sector. While there is hope that more hybrid and experimental forms of governance approaches will manifest in new types of governance capacities, their mechanisms and effectiveness are still poorly understood. There is also considerably less understanding of whether the initiatives formed by local governments and actors deliver transformative capacity and how this could be developed. Against this backdrop, the aim of this paper is to provide insights into experimental practices of importance for building transformative planning capacity in strategic, long-term transport and mobility planning. By exploring the transformative planning capacities in the facilitation of and experimentation with mobility hubs in four Swedish municipalities (Linköping, Malmö, Umeå and Uppsala), we seek to illustrate the role of transformative spatial planning in shaping local capacity for transformative change. The investigation is guided by the following research question: How can local authorities build capacity for transformative change through experimentation in spatial planning?

In the following section, we first elaborate on the role of transformative planning and its relation to urban experimentation and climate governance. Second, we discuss transformative planning capacities and introduce our analytical framework. Thereafter, in the methods section, we present our case studies, methods and empirical material. Next, in the results section, we present our findings and analysis of the empirical material in relation to transformative planning and capacities for transformative climate governance. The paper ends with a concluding discussion.

2 Transformative planning capacities

There is a consensus about the vital role that local governments can play in transformation towards sustainability, particularly through policy and by creating suitable institutional conditions (Bulkeley/Marvin/Palgan et al. 2019: 317), including the allocation of appropriate resources to support transformative planning practices (Hölscher/Frantzeskaki 2021: 2). Hence, the role of local authorities and the initiatives they prioritize will impact local transformative capacity (Wolfram/Frantzeskaki/Maschmeyer 2016: 22). This highlights the importance of key actors, such as planners, and their influence on how cities are organized. Thus, the capacity to transform urban systems is also influenced by how actors perceive their role in change (Wolfram 2019: 484) within a specific geographical context (Hölscher/Frantzeskaki 2021: 13). As already mentioned, transformative planning practices can be seen as a means of opposing the current way of doing things, where planning futures need to be imagined as radically different from the present reality (Albrechts/Barbanete/Monno 2020: 2). We see transformative planning as a practice where specific activities take place on a local level, as “a force of change and to look for visions, means and instruments to produce alternatives” (Albrechts/Barbanete/Monno 2020:

2). In all this, working with sustainability goals and future visions has become a common planning activity for municipalities, leading to diverse experimental and co-productive planning practices that include more radical spatial approaches (Frantzeskaki/Castán Broto/Coenen et al. 2017: 1–2; Fuenfschilling/Frantzeskaki/Coenen 2019: 220), which also involve risk-taking and thinking of alternative solutions.

In line with this development, research on climate governance and sustainability transitions has increasingly highlighted the importance and potential of experimental approaches to challenge and transform established structures, organizational practices and ways of working (Bulkeley/Castán Broto 2013: 362; Bulkeley/Castán Broto 2014: 396; Karvonen/van Heur 2014: 380; Eneqvist/Karvonen 2021: 184; Grundel/Trygg 2024: 1791). Hence, transformative planning practices also include a shift towards experimental governance, where local authorities use urban experimentation to test new innovative solutions that can lead to more sustainable communities and to address complex challenges. Such urban experiments can be seen as a means for testing innovative ideas and strategies in a controlled space, including risk taking, strategic efforts, envisioning and creating alternative scenarios in urban planning and an openness to unforeseen outcomes (Bulkeley/Castán Broto 2013: 373; Bulkeley/Castán Broto 2014: 397; Eneqvist/Karvonen 2021: 185). There is a belief that city-based experiments can be scaled up and transferred to other contexts (Bulkeley/Marvin/Palgan et al. 2019: 320) and eventually generate broader system change (Hodson/Marvin 2010: 477; Geels 2011: 24). However, such experimentation has been criticized because of its limited scale, and the difficulties of drawing lessons from experiments that can be applied elsewhere, in a different context (Evans/Karvonen 2014: 416). This development is in turn changing the context of what municipalities, local politicians and officials (planners) do (Mukhtar-Landgren/Kronsell/Palgan et al. 2019: 718–719). For example, experimentation challenges more traditional ways of governing through formal rules and regulations (e.g. master planning), moving towards more strategic functions and building on collaboration and networking (Agger/Sørensen 2018: 57). This also implies new roles for local authorities and planners, moving from more traditional roles as regulators towards active facilitating and steering of transformation (Hölscher/Frantzeskaki/Loorbach 2019a: 792). These new and mixed ways of governing the climate may offer new possibilities for developing transformative planning capacities, but their workings and effectiveness are still unclear (Jordan/Huitema/Hildén et al. 2015: 977; Luederitz/Abson/Audet et al. 2017: 401). This leads us to the analytical framework of this paper.

So far, the integration of transformation literature in urban and regional scholarship has been limited, and the transformation literature has not sufficiently incorporated existing work from planning scholars on transformative planning. Hence, in this paper, we aim to contribute to this emerging field by basing our analytical framework on Hölscher/Frantzeskaki/Loorbach's (2019a: 795) capacities for transformative climate governance in relation to work on transformative planning. We use their four different capacities to address transformation planning dynamics: (1) stewarding (responding to disturbances), (2) unlocking (phasing-out drivers of path dependencies), (3) transformative (creating and embedding novelties) and (4) orchestrating (coordinating multi-actor processes), in this way mapping municipal planning activities related to urban experimentation and considering whether they create conditions for transformative planning in Swedish municipalities. The framework provides an agency-oriented perspective to study the activities local authorities create for transformative governance, where the capacities relate to transformative dynamics. In this paper we use the term governance to refer to the diverse types of actor participation in planning practices towards the goal of becoming climate neutral by 2030.

We apply transformative planning capacity from an understanding that the institutional conditions are shaped by planners' norms and practices. Planning is not an individual act, but rather a result of interactions between actors in institutional settings that in turn are shaped by various social, material and spatial conditions. Therefore, institutions both enable and restrict actions and are formed by individuals' work practices to handle rules, knowledge and resources (Wolfram 2019: 479).

3 Cases and methods

In this study our focus is on the municipal (local) level as local (mainly urban) areas have been identified as a key scale for addressing transformative change (Bulkeley/Betsill 2005: 42–43; Bulkeley/Castán Broto 2013: 361). The municipalities (Linköping, Malmö, Umeå and Uppsala) were selected for two reasons. Firstly, they all participate in Viable Cities, a strategic innovation programme focusing on the transition to climate-neutral and sustainable cities by 2030 through system innovation. Secondly, in collaboration with Linköping University and the Swedish Transport Administration, they were part of a design phase as system demonstrators for urban experimentation with mobility hubs and how to support system change in the transport sector. The initiative on system demonstrators was financed by Vinnova, the Swedish Innovation Agency, and is used

as a new planning tool aiming to identify relevant actors to achieve systemic transformative change within a specific area, as well as to identify hindrances and barriers to such change.[1] Thus, our choice to focus on these four municipalities was a strategic selection motivated by their potential to provide information on the research issue (Flyvbjerg 2006: 220–221).

The municipalities all differ in size and population but are all facing growing populations and rapid urbanization. Linköping, situated in southeastern Sweden, is the fifth largest municipality in the country, with a population of approximately 167,500.[2] As early as 2012, the municipality of Linköping set the climate goal of becoming carbon neutral by 2025. This goal is unlikely to be achieved, but it remains an interim target in the adopted Climate and Energy Programme 2022-2030. The overall goal for Linköping is to reduce the share of car traffic from about 60 percent to about 40 percent by 2030 and at the same time increase the share of public transport and cyclists. One-third of all trips in Linköping are made by bicycle. Malmö, located in southern Sweden, has a population of about 362,000.[3] In 2020, cars and transport vehicles accounted for 33 percent of Malmö's greenhouse gas emissions, causing air and noise pollution. The goal for Malmö is to increase travel by public transport and bicycle and thus to reduce its environmental and climate impacts. Malmö has a strong connection to sustainability and innovation, with several initiatives aimed at improving the city's environment and quality of life. Umeå, in northern Sweden, has a population of approximately 133,000.[4] The municipality has set the goal that the share of trips made by public transport, bicycle or on foot should be at least 65 percent of all trips for residents within the Umeå urban area by 2025. Umeå is recognized for its commitment to sustainability and development, with numerous projects aimed at enhancing quality of life for its residents. Uppsala municipality, in east-central Sweden, is a growing region with a population of approximately 245,000.[5] By 2050, all travel and transport in Uppsala municipality should use sustainable modes of transport.

The empirical material in this study builds on qualitative methods, including in-depth semi-structured interviews, workshops, fieldwork and an analysis of policy documents (reports, plans, programmes, climate contracts) in the four municipalities. Our focus was mainly on transformative planning practices and initiatives related to mobility through work with mobility hubs in the municipalities. The empirical data was collected and analysed by the two authors.

In total, 14 semi-structured interviews with planners in the four municipalities were conducted between 2020 and 2022 (see Table 1). The interviewed planners can be described as decision-makers regarding transport planning in the municipalities and can be viewed as key actors within transformative planning, as they all worked strategically with transport planning in relation to mobility hubs. The interviews lasted for approximately one hour and were recorded and transcribed in Swedish. Quotes in English have been translated by the authors. The interviews were analysed and coded using Nvivo. The interview guide was structured around four themes: the role of planning in the transformation of the transport sector; whether the planning work in the municipality was changing to address innovations, climate change and transformation; the influence of Viable Cities on planning; and how planners work with mobility hubs. The interviewees were also asked to provide examples of other local initiatives and projects related to mobility and sustainability. We inquired about the policies, strategies and visions they used, how they implemented them, what collaborations they had and their capacity to work on these issues. The aim was to provide knowledge about transport planning and, more specifically, about the development of mobility hubs in the municipalities.

We also conducted fieldwork in the four municipalities, where we carried out both observations and walking interviews with planners to observe activities and surroundings, focusing on mobility hubs/houses that have either been developed or are under development (see Layton/Latham

[1] https://viablecities.se/en/systemdemo (28.06.2025).

[2] https://www.scb.se/hitta-statistik/statistik-efter-amne/befolkning-och-levnadsforhallanden/befolkningens-sammansattning-och-utveckling/befolkningsstatistik/pong/tabell-och-diagram/folkmangd-och-befolkningsforandringar---helarsstatistik/folkmangd-i-riket-lan-och-kommuner-31-december-2023-och-befolkningsforandringar-2023/ (28.06.2025).

[3] https://www.scb.se/hitta-statistik/statistik-efter-amne/befolkning-och-levnadsforhallanden/befolkningens-sammansattning-och-utveckling/befolkningsstatistik/pong/tabell-och-diagram/folkmangd-och-befolkningsforandringar---helarsstatistik/folkmangd-i-riket-lan-och-kommuner-31-december-2023-och-befolkningsforandringar-2023/ (28.06.2025).

[4] https://www.scb.se/hitta-statistik/statistik-efter-amne/befolkning-och-levnadsforhallanden/befolkningens-sammansattning-och-utveckling/befolkningsstatistik/pong/tabell-och-diagram/folkmangd-och-befolkningsforandringar---helarsstatistik/folkmangd-i-riket-lan-och-kommuner-31-december-2023-och-befolkningsforandringar-2023/ (28.06.2025).

[5] https://www.scb.se/hitta-statistik/statistik-efter-amne/befolkning-och-levnadsforhallanden/befolkningens-sammansattning-och-utveckling/befolkningsstatistik/pong/tabell-och-diagram/folkmangd-och-befolkningsforandringar---helarsstatistik/folkmangd-i-riket-lan-och-kommuner-31-december-2023-och-befolkningsforandringar-2023/ (28.06.2025).

Table 1 Overview of the study's empirical material

Municipality (inhabitants)	Interviews and workshops (year)	Municipality documents	Swedish Transport Administration documents
Linköping (167,404)	Interview: Traffic planner (2020) Interview: Environmental coordinator (2021) Interview: Head of municipal parking company Interview: Project leader testbed (2022) Workshop 1-6 (2021) Workshop 9 (2021)	Traffic plan Linköping (2022) Traffic strategy (2010)	
Malmö (362,133)	Interview: Traffic planner (2021) Interview: Traffic planner (2021) Interview: Head of Unit Traffic and Environment (2021) Interview: Environment strategist, Malmö parking Workshop 1-3 (2021) Workshop 7 (2021)	Sustainable Urban Mobility Plan (2016) Policy and standard for mobility and parking in Malmö (2020) From parking houses towards mobility houses (2020) To transform Parking Malmö into Mobility Malmö – An investigation into possible ways forward (2021)	
Umeå (133,091)	Interview: Traffic planner (2021) Interview: Traffic planner (2022) Interview: Urban planner, project leader (2022) Workshop 1-6 (2021)	FÖP Traffic Umeå (2018) Compilation of knowledge service and mobility hubs – examples and lessons learned Umeå, (2019) Lessons learned about service hubs 2018-2020, Umeå municipality (2019)	
Uppsala (245,329)	Interview: Traffic planner (2021) Interview: Traffic planner (2021) Interview: Head of unit traffic planning and mobility (2021) Workshop 1-6 (2021) Workshop 8 (2021)	Action plan for mobility and traffic (2021) Mobility and Traffic Programme (2022) Future Mobility (2019)	
National level			2022 report of the government mission Mobility as a service, Trafikverket PM (2022). A survey on the need for digital infrastructure at an exchange point or mobility hub PM, Trafikverket (2022). Theoretical demonstration project of an exchange point. Basis for accounting for government assignments, mobility as a service, Trafikverket (2021).
	Total interviews: 14 Total workshops: 9	Total municipal documents: 13	Total documents: 3

2022: 757). The aim was to gain a deeper understanding of how mobility hubs were developed in the four municipalities.

A total of nine workshops were carried out (see Table 1). Six of these workshops included officials from the four municipalities and the Swedish Transport Administration (Workshops 1-6). The remaining three workshops were held with traffic planners and officials in three of the municipalities, focusing on mobility hubs as enablers for a more accessible and resource-efficient transport system. These workshops also facilitated the sharing of knowledge from work with mobility hubs. Thus, Workshop 7 took place in Malmö with three municipal planners, Workshop 8 in Uppsala with six municipal planners and representatives from the municipal parking company, and Workshop 9 in Linköping with five municipal planners and representatives from the municipal parking company. These sessions focused on discussion of the development of mobility within each specific municipality, definitions and shared insights from the work with mobility hubs. All workshops were recorded and transcribed in Swedish.

We also conducted a document analysis of 16 strategic documents in each of the four municipalities, focusing on the work with mobility hubs (see Table 1) and their relevance to achieving sustainable mobility. In Sweden, transport and mobility plans can have different names and sometimes also include a traffic and parking strategy. If the municipalities had a specific document about mobility hubs, it

was included in the analysis. We also included additional policy reports produced by actors other than the municipalities that specifically targeted mobility hubs. Initially, the documents were read carefully and then coded in Nvivo. A basic framework for the analysis was to explore transformative planning capacities and the types of governance capacities needed in the municipalities, building on Hölscher/Frantzeskaki/McPhearson et al. (2019b: 845–847).

4 Transformative planning in Sweden

In Sweden, in contrast to many other countries, the municipalities, in principle, have a monopoly on land-use planning. This means that they have the right to decide where and when urban development takes place (Blücher 2006: 137; Persson 2020: 1190). This encompasses overarching goals and guidelines, including financial planning and taxation. As such, spatial planning in Sweden often involves taking part in policymaking, and working with consultants, civil servants and academia. The public sector in Sweden uses strategy documents in almost every policy field, not just in a specific field of governance. Transformative planning involves working closely with planning instruments, such as plans, (comprehensive plan, Sustainable urban mobility plan (SUMP), parking plan or green structure plan), guidelines (e.g. traffic and mobility strategy or guidelines for mobility as a service (MasS)) and programmes (e.g. mobility and traffic programme). There is also evolution in the field in relation to experimentation such as living labs, testbeds, platforms and innovation districts that have become important planning instruments.

Today, many of the municipal planning visions, means and instruments address goals and visions towards climate neutrality. In the four municipalities under consideration here, mobility hubs were used as a transformative planning practice. On a broader level, mobility hubs have emerged as a potential planning tool to shift our current transport systems away from car dependency (Tiboni/Rossetti/Vetturi et al. 2021: 4). Mobility hubs can be classified based on their location and the environment they are in, from smaller neighbourhood hubs to larger hubs integrated in the greater transport system (Czarnetzki/Siek 2023: 2197). As such, they can be defined as confluences of multiple transportation modes or services including car-sharing, bike-sharing and e-scooters in specific locations to promote multimodality (Anderson/Blanchard/Cheah et al. 2017: 65). In Sweden, the development and implementation of mobility hubs is a relatively new phenomenon, although there are some ongoing pilot projects in Swedish municipalities (Bäckström/Roberg 2022: 31; Trygg/Grundel 2025: 3).

5 Results and analysis

This section presents the findings from our analysis of Linköping, Malmö, Uppsala and Umeå with the aim of exploring how local authorities can build transformative planning capacity. The section is structured along the four governance capacities; stewarding, unlocking, transforming and orchestrating (see Table 2) but with the addition of transformative planning capacity. The second column in the table represents both the planning and governance challenges in relation to transformative change. The third column presents the planning activities we believe are important for the transformative planning in column four. We use the term transformative planning capacity to convey an understanding that institutional conditions are shaped by planners' norms and practices. We have used the framework as an analytical tool to understand ongoing transformative planning capacities, including experimental approaches.

Table 2 Analytical framework: capacities, challenges and activities of transformative planning (adapted from Hölscher/Frantzeskaki/Loorbach 2019a: 794–795)

Governance capacity	Planning challenge	Planning activity	Transformative planning capacity
Stewarding	Handle uncertainties through communication	Plan-making, vision-making, long-term goals	Being proactive, flexible, seeing opportunities, common agreement, goals, visions, generating knowledge, learning, creating strategies, communication skills
Unlocking	Identify and handle path dependency	Identifying systems and structures, scenario planning by linking past to future, road mapping	Changing existing environment and structures, inventories, identifying drivers, trends
Transformative	Create and foster change	Political support, advocating, experimentation, testing, communicating visions and goals	Testing agreement, having courage, proactivity, fostering political support
Orchestrating	Coordinate by facilitating spaces to exchange knowledge	Networking, partnership, connection nodes, strategic planning, platforms	Compromising around differences and conflicts, creating strategic frameworks, knowledge exchange, implementing visions and goals

5.1 Stewarding capacity

Stewarding capacity within transformative planning is about understanding current and future challenges and managing uncertainties about the future (Hölscher/Frantzeskaki/McPhearson et al. 2019b: 846). Communication is viewed as an important means of handling planning challenges for the municipalities. Important planning activities include creating plans, visions and long-term goals (Albrechts/Barbanete/Monno 2020: 3) that can support the overall sustainable goals in the municipalities and transformation of the municipal transport and mobility systems. The four municipalities in this study all have ambitious climate goals, but there is a lack of more concrete interventions intended, for example, to enable climate neutrality by 2030. Stewarding capacity is also about being able to use planning tools to achieve common goals. When using the example of mobility hubs as a tool to achieve systemic change in the local transport systems, one of the major planning challenges in all the municipalities is reaching a common agreement about the definition of mobility hubs and thus also about their design and future implementation. This involves changing existing structures and practices where planning is a central tool and where the implementation of mobility hubs can play an important part, requiring new ways of planning and the finding of new solutions.

Starting at the Swedish national level, there are currently no general policies or guidelines for the development of mobility hubs. The lack of policy documents, and thereby the lack of a clear definition of their meaning, brings both advantages and challenges for the municipalities. An advantage is that the municipalities are relatively free to experiment, develop and design mobility hubs. However, the lack of more general guidelines and an overall definition is pointed out as a main concern in all municipalities. A challenge is that mobility hubs are developed differently both between and within the municipalities, which can impact the way citizens and users understand and use the hubs. This has also made it possible for private actors to develop mobility hubs with different functions and services. As a result, there are many different definitions and functions ascribed to mobility hubs in the municipalities, varying from mobility houses, mobility stations, mobility zones and mobility nodes (see also Trygg/Grundel 2025: 4–5). This was also problematic between the municipalities as they could not agree on a more general definition. It was especially emphasized that a common definition of mobility hubs within the municipalities was important for communication and to be able to explain what a mobility hub is externally, to, for example, citizens, "as many do not understand what a mobility house or a mobility hub is and how it should work" (Uppsala workshop). The four municipalities have agreed on a roadmap where they define mobility hubs. A common definition was also important to communicate internally within the municipalities so that everyone worked towards the same goal.

"I don't know if we really have the same definition of what these hubs are because there have been requests to include logistics functions and such things. We are just talking about shared vehicles now and then we will see if, at some point, it might be interesting to coordinate with other functions, but we are mainly talking about shared vehicles" (interview Malmö).

None of the comprehensive plans in the municipalities outline a general planning principle for mobility hubs as part of the municipal transport system. Plan-making is an important planning activity, and without concrete strategies, it is difficult for the municipalities to implement mobility hubs. However, the municipalities have started to integrate them into their transport plans and various other strategic documents. For example, in Linköping's traffic plan (2022), mobility hubs are highlighted as a tool to enhance the attractiveness and accessibility of the city centre by promoting sustainable modes of transport. Parking and transfer points should be seamlessly integrated into the urban structure and designed to contribute to a vibrant urban life (Linköpings kommun 2022). The municipality defines mobility hubs as "a place where various mobility services dock or park. The primary function of a mobility hub is to offer various types of mobility. However, other services and amenities can also be advantageously connected to the hub" (Linköpings kommun 2022: 29). In Malmö and Umeå, the guidelines have mainly served as overviews of examples of mobility hubs and other mobility facilities (see for example Umeå kommun 2020; Malmö stad 2021). In Uppsala, there are no clear guidance documents, but Uppsala describes mobility hubs as the infrastructure around flexible forms of parking solutions with a range of different services, including mobility pools, autonomous cars, electric bikes and shared vehicle pools. In Umeå, the municipality is not officially working on implementing mobility hubs, except for a planned residential area, Tomtebo strand, where several mobility services will be part of the parking facilities in the area. For example, there will be access to bike garages, carpools, electric bikes and cargo bikes gathered in a common 'hub'.[6] The aim is to reduce car dependency for the people living in the area. Similarly, all four municipalities are planning to or have implemented mobility hubs/houses in newly built residential areas (for example Vallastaden in Linköping, Ul-

[6] https://tomtebostrand.se (28.06.2025).

låker and Rosendal in Uppsala, and Brunkebostrand and Hyllie in Malmö).

As pointed out above, all the municipalities have started to develop local guidelines for the implementation of mobility hubs, and they all look different with diverse aims. Thus, it is necessary to clearly state what they should contain and that the aim and goal of their development is to support a more sustainable transport system by providing easy access to sustainable modes of travel. In this way, the officials aim to be in control of the meaning of mobility hubs and clearly state the difference between a parking house and a mobility hub. The main difference is that a parking house is a physical building, but a mobility hub does not need to have a physical building. This highlights the importance of communication, using common language, definitions and strategies to be able to work with planning tools towards transformative change. Additionally, the work of defining and agreeing on common definitions and symbols of mobility hubs in plans and strategic documents was also part of joint learning processes on the local scale. This was specifically emphasized by the local officials as important to be able to work towards change and a common goal and to start implementing mobility hubs.

5.2 Unlocking capacity

Unlocking capacity involves managing and identifying lock-ins and path dependencies to drive sustainability goals. In spatial planning, these path dependencies and lock-ins refer to the challenges inherent to changing norms and values and making alterations to the built environment and local infrastructures. To achieve unlocking capacity, it is crucial to identify the key actors, understand their mandates and support new initiatives. Research shows that it is especially difficult to implement planning interventions aimed at reducing car use and changing established organizational structures within the municipalities (Börjesson/Kristoffersson 2018: 35; Trygg/Wenander 2022: 1997). Municipal infrastructure investments often involve established systems or structures that are difficult to change, due to investments in existing infrastructure, for instance where the state, through the Swedish Transport Administration (Trafikverket), is responsible for public roads. The exception is public roads that are part of municipal road maintenance, which makes mobility hubs a possible way forward as they are treated as part of municipal roads. However, all municipalities indicate that when it comes to existing structures, it is difficult to change, for example, an entire street to develop a mobility hub. To address such matters and make minor changes in the infrastructure, the municipalities have started to test mobility interventions on a smaller scale. For example, in Linköping, a small number of parking lots along the streets have been replaced and turned into bicycle parking. Much of the planned structure in Malmö is expected to be around the existing bike-sharing system, 'Malmö by bike', which is owned by the municipality. The service is mainly financed by advertisements, which has also been seen as an important success factor and a reason for its existence. The implementation of mobility hubs in the city is planned to build on the existing bike-sharing system and to integrate other shared services. However, it is difficult to combine the system with other shared services as it needs to be combined with services from private actors, who are currently not willing to offer their services all over the municipality.

In Linköping, the municipality also aims to develop a mobility network that covers the entire city, with the idea that a mobility hub should be part of a larger transport system. Here, the municipal parking company was identified as an important enabler for developing mobility hubs, as they were the first to establish them, and other actors were expected to follow their example. So far, the municipal parking company has built mobility houses on the outskirts of newly built residential areas. The main goal has been to create car-free residential areas and to offer the residents other services besides parking in the mobility houses. This case, however, shows that established patterns are difficult to change and that it is important to identify the relevant actor who can drive change. Planning capacities involve understanding who the drivers of change are. In this case, the municipal parking company plays an important role in driving changes by developing mobility hubs. On the other hand, this role is also new for a car-parking company and highlights that actors can assume different roles: breaking away from business-as-usual can foster new alliances and options for change.

In all municipalities, the reluctance to shift towards more sustainable travel modes is frequently mentioned in both workshops and interviews. The officials perceive that there is often resistance among citizens when it comes to changes in the road networks aimed at reducing car traffic and parking, as these topics are sensitive. It was noted during one workshop that changes in public areas can lead to conflicts. For instance, converting squares into mobility hubs poses a risk. "A square should remain a square, while a mobility hub has a different appearance and other needs" (Linköping workshop). There are challenges in imagining things differently, and there is a tendency that when designing and envisioning mobility hubs, they are commonly described as being established and developed around a square or in a specific area.

The municipalities need to change existing patterns, structures and systems. Finding the capacity to shape this in planning practice is sometimes difficult because of norms such as car dependency and established structures regarding

land use. Other issues are related to lock-ins affecting both the built environment and infrastructure systems as well as organizational structures. For example, it is challenging to change existing infrastructure such as streets, roads and squares to utilize or convert areas in cities for mobility hubs. This issue is also about changing established structures and systems, which within municipal operations is often a slow process, whereas transport and mobility planning today is often faced with rapid changes in mobility services.

5.3 Transformative capacity

Transformative capacity involves creating, testing and introducing innovations that can lead to transformative change through, for example, test beds, demonstration arenas and living labs. This challenges current planning structures as it means going outside more rigid municipal frameworks. Transformative capacity is about fostering opportunities for innovation, challenging dominant regimes and promoting broader acceptance of new solutions. As such, transformative capacity can be defined as the ability of actors to generate new ideas and courageously integrate them into new structures, practices and systems (Wolfram/Frantzeskaki/Maschmeyer 2016: 22). This is achieved by making new innovations visible and embedding them within existing or new structures, systems and practices.

As mentioned earlier, the four municipalities in this study are all part of the national innovation programme Viable Cities, and they were also part of a project within that programme as system demonstrators for mobility hubs. These two initiatives push the municipalities to work with more experimental forms of governance and to test and implement new solutions that can lead to system change. So far, much of the work around mobility hubs in the municipalities has involved testing and developing new mobility solutions, but with varying outcomes and degrees of implementation. Currently, there are examples of mobility houses in Malmö, Uppsala and Linköping. In all these cases, the municipalities have supported the risks and facilitated the implementation.

In Umeå, a hub concept was tested and set up as a pilot project in relation to shared cargo bikes (called U-bike), where the municipality established two cargo-bike nodes in the city, combined with a bike garage in the city centre. The aim was to promote more sustainable ways of travel by allowing citizens to test and use different cargo bikes, thereby changing their perceptions about the usage of cars. Initially, the goal was to combine the hubs with other modes of travel, but it has been difficult to persuade private actors to get established in the municipality.

In Malmö, the municipality has experimented with mobility hubs in combination with 'Malmö by Bike'. In 2024, the municipality tested two distinct mobility hubs. One of them was tested during the summer, in a so-called summer square, where car parking was temporarily removed during the summer months to test a mobility hub offering shared mobility solutions. The second hub was a further development of the existing mobility house "Anna" where additional mobility modes were added, including car-pools, electric bikes, cargo bikes, 'Malmö by Bike' and e-scooters.

The shift to experimental forms of governance, requiring municipalities to incorporate urban experimentation into their planning practices and to test new solutions that can drive transformation, put pressure on the municipalities to integrate such work into existing structures, cultures and planning practices (see also Bulkeley/Castán Broto 2013: 362; Eneqvist/Karvonen 2021: 191), as also shown in the examples of Malmö and Umeå. However, urban experimentation requires political support and courage, as it challenges traditional governance structures, such as comprehensive planning and policymaking, in favour of more strategic functions (Agger/Sørensen 2018: 56). The officials in the four municipalities all point to the importance of political support and the political will to make things happen. For example, in Malmö, a political decision led to the implementation of 100 mobility enclosures, which made it possible to convert former parking spaces into parking for electric scooters. Such decisions are often perceived as controversial with politicians fearing they might lose popularity, but at the same time this demonstrates that with political will and courage, change is possible.

Relevant to political will and an essential part of such planning and governance processes is the development of long-term strategies and visions for the city, which are crucial for politicians to make commitments towards testing more sustainable futures: "Then you can imagine that there is still – I would say – an established way of working in Malmö, which is about testing. Politicians, I feel, are quite comfortable or fond of 'yes, but we test' and that is also very important, I think, because it is sometimes a bit easier, and you get started if you just allow yourself to test a little. Not that it is just a 'test', we know that too" (Interview Malmö).

At the same time experimentation has been criticized for being short-term and project-oriented, with the impact of such projects tending to be limited if they occur outside of ordinary municipal work (Bylund/Riegler/Wrangsten 2022: 6–7). However, in the case of the municipal work with mobility hubs in the four municipalities there is an ambition to move beyond the experimental phase: "Test beds, pilots we are almost past. We have reasoned here in Uppsala that we want to get past that. We want to work for real, so to speak, here and now. We have built mobility houses, we have allocated new plots, have several plans underway where we

will point out that we will work in this way" (Workshop Uppsala).

This also demonstrates that, in relation to mobility hubs, municipalities have had the transformative capacity to experiment with new approaches. Officials have garnered and solidified support across departments and among local politicians in various ways. Additionally, the smaller-scale adjustment of converting a parking lot into bike parking has played a significant role in gaining acceptance for such changes.

Part of transformative planning is to envision the future as something radically different (Albrechts/Barbanente/Monno 2020: 2). Similarly, a crucial part of transformative capacity is future vision-making and goals (Hölscher/Frantzeskaki/McPhearson et al. 2019b: 846). Even though it can be debated whether mobility hubs are part of a radically different future, the municipalities have been working with visions and imaginaries to signal and communicate the possible role of mobility hubs in their future cities and to foster political support. In Malmö, the planning department developed several visionary images to illustrate what a mobility hub can be and as something to work towards. These visions include the design of an entire street and its surroundings when planning for the mobility hubs. Part of this imaginary is also the design and layout of logos and signs that can be used to communicate where and what services a specific mobility hub offers (Workshop Malmö). Similarly, Linköping described the way in which mobility hubs can be a planning tool to increase acceptance of shared mobility, making it more visible and encouraging new travel habits. Mobility hubs are also seen as a step towards reducing congestion and strain on the road network. In Uppsala, working with common visions, political goals and strategies was central to the implementation and planning of mobility hubs. Additionally, in Umeå, the work with U-bike and the planning of hubs in newly established residential areas also aims to support a reduction of car usage among citizens and residents.

5.4 Orchestrating capacity

Coordination capacity involves creating conditions where multiple actors can collaborate to achieve a common goal. It encompasses both coordinating to ensure a long-term approach and fostering collaboration between different actors. Such processes also raise questions about the future role of planning and whether local planning offices should be responsible for these tasks (Eneqvist/Karvonen 2021: 188–189).

One of the major challenges for municipalities is to govern strategically. This involves mediating between different actors across scales, sectors and time. There is a clear tension between municipalities, property companies and municipal parking companies (owned by the municipality), as they all operate under different terms. In the case of mobility hubs, gathering services from different market operators with varying interests and types of shared services is challenging. For private companies, profitability is the main concern, while for municipalities, it is about maintaining a service for citizens and developing more sustainable transport systems. This also highlights uncertainties regarding the role of municipalities and who should take responsibility for developing mobility hubs if there is no clear coordination. For example, in Linköping, mobility hubs can be established by both private and municipal actors, in open spaces, buildings or larger properties. Municipalities hence see a risk that private property companies may rename their parking garages to mobility houses without significantly changing the content and design, potentially leading to the greenwashing of existing parking garages rather than contributing to more sustainable transport systems. In Malmö, the planners want to see a more structured development of mobility hubs and have therefore initiated dialogues with both the parking company and the regional authorities. Another issue in Malmö is how the development of mobility houses should be established: "Yes, we have thought a lot, but we have not really put anything down yet. Because we have thought: But what are our goals around this? Accessibility is very important, which we are trying to convey now when we had an exhibition about mobility hubs. So, we talked, we thought: But we focus on accessibility. Then this is kind of a side effect and hopefully, we can reduce car ownership and car use and so on, and in that way affect emissions. But it is still accessibility that we must […]. It is the social aspects of the whole thing that we need to emphasize" (Interview Malmö).

Despite much of the literature on urban experimentation and transformative change emphasizing collaboration between different actors to develop new solutions (Roebke/Grillitsch/Coenen 2022: 215), it is primarily the municipalities that have worked on developing definitions and roadmaps for mobility houses and mobility hubs. When it comes to mobility houses, municipal companies have taken the lead, although there are examples of private actors building mobility houses, such as in Hyllie in Malmö. In these cases, only residents can use the mobility houses, limiting access for other citizens. Additionally, the municipality cannot influence the content or design of these houses as they can with municipally owned houses. In Uppsala, private developers have also been involved in providing services such as bike pools and other micromobility solutions.

This highlights several challenges for municipalities in coordinating and collaborating with different actors in the development and operation of mobility hubs. There are sig-

nificant questions about the roles of the municipality and the municipal parking company, and how collaboration with private actors should be structured, given that operations are driven by different logics in relation to the public good.

6 Concluding discussion

The aim of this paper was to provide insights on experimental practices of importance for building transformative planning capacity in four Swedish municipalities and their work with mobility hubs as a strategic tool towards transformative change. Our research was guided by the overall research question: How can local authorities build capacity for transformative change through experimentation in spatial planning?

To understand how local authorities work towards transformative planning practices, we presented an analytical framework that combines capacity building in transformation and transformative planning literature. The framework provides understanding of the municipal capacities, challenges and activities required for addressing transformative planning towards sustainability. Using the example of how municipalities have used mobility hubs as an urban experiment, this highlights the role of local conditions and structures of the planning environment in influencing how transformative planning is practised by planners. The findings illustrate that the approaches and priorities of planners in municipalities will influence local capacity building. The example of mobility hubs in municipalities shows that communication around future visions and goals is an important feature in the implementation of new planning tools towards change. Even though local contexts and adaptations are important, the push for more sustainable transport systems will require increased coordination and coalition building with different actors and stakeholders to solve complex planning challenges (Wallsten/Henriksson/Isaksson 2021: 542; Purkarthofer 2022: 88–89). Additionally, the literature on experimentation highlights the importance of including actors from civil society, research institutions, business and industry to collaboratively find solutions that address the increasing complexity of society and more complex societal challenges (Loorbach 2010: 164; Fuenfschilling/Frantzeskaki/Coenen 2019: 220). The example of mobility hubs illustrates that implementing new innovations in the mobility sector may require new governance models to achieve more consistent planning tools, enabling change and challenging existing norms and structures. However, further studies are needed to examine more urban experiments in municipalities to understand transformative planning capacities.

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