CASUAL
Co-creating Attractive Sustainable Urban Areas and Lifestyles
Exploring new forms of inclusive urban governance

URBAN EUROPE

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SYNTHESIS REPORT FROM THE CASUAL PROJECT
June 2016

Nordregio
Austrian Institute for Spatial Planning
OTB Research for the Built Environment, Delft University of Technology

Co-creating Attractive and Sustainable Urban Areas and Lifestyles:
Exploring new forms of inclusive urban governance

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Stockholm, Sweden, 2016

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For more information about CASUAL see:
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1. Introducing the project

As the title indicates, this project has several key areas. The first key area is 'co-creation': placing collaborative efforts at the centre of promoting attractive and sustainable urban development. 'Urban areas and lifestyles' implies that both planning ambitions and the citizens' ways of life are relevant. 'New forms of inclusive urban governance' entails the consideration of 'urban living labs' as experimental environments and as a methodology for the inclusion of a diverse range of actors, and the exploration of new ideas and modes of cooperation.

One of the starting points for this project was the fact that debates about urban governance and planning are still centred on developing the built environment and technical infrastructure to create attractiveness and sustainability, and that less attention is paid to changing lifestyles and behaviours.

Therefore, one central argument of the work in the CASUAL project is that processes towards smarter and more sustainable cities cannot only be about resource- and energy-efficient built environments and technical infrastructure; they must also involve information about behavioural patterns and include the views of a diversity of stakeholders and other concerned actors who are often overlooked in urban development approaches, planning and governance practices (see figure 1). This means that a deeper understanding of why people behave in the ways that they do is crucial for designing institutional structures and policy measures that can effectively promote sustainable behaviour. In this light, urban living labs have the potential to generate arenas for new ideas and to include various actors.

Thus, the research in the CASUAL project took a critical position and focused on urban discourses and ideas about sustainable urban planning, urban development and governance. This resulted in a few more specific study objects, including the analysis of transit-oriented development (TOD), mobility patterns, planning processes and forms of governance, and urban development visions and ways of living. We used the notion of 'urban living labs' as an analytical lens through which we examined self-organized soft modes of urban governance that highlighted co-creation, exploration and experimentation.

The CASUAL project is a collaboration among researchers from Nordregio - the Nordic Centre for Spatial Development in Stockholm, Sweden; the Austrian Institute for Spatial Planning (OIR) in Vienna, Austria; and Delft University of Technology, the Netherlands.

1.1. Images, values and norms of sustainable urban areas and lifestyles

One key research objective of the project was to investigate planning for sustainable urban areas and lifestyles and to explore the values and norms with which these practices are imbued. This includes the values and norms of individuals (citizens, consumers and dwellers) and planning organisations and institutions (public and private) and thus encompasses both the production and consumption sides of sustainability and the built environment. What kind of sustainability is envisioned and practised? Who is included and who is excluded by relevant strategies and practices?

The focus of the research was not to define a sustainable city or lifestyle, or even to assess it. Rather, the aim was to investigate how central notions are given meaning in different cases and to examine the normative underpinnings of sustainability and urbanity. We approached this by investigating ways of life in Vienna–Liesing (Austria) and mobility patterns in the Randstad (the most urbanized part of the Netherlands), and by analysing planning strategies and discourses in Stockholm (Sweden).

1.2. Urban living labs and inclusive governance

The other key research objective of this project was to explore the urban living lab as a form of experimental and potentially inclusive mode of urban planning. In recent years, the notion of a living lab has emerged to capture a number of arenas and methodologies that are underpinned by four general principles: co-creation, exploration, experimentation and evaluation. Although the scope and character of these labs seem to vary significantly, the general idea is to test and develop

alternative solutions for complex challenges, such as planning attractive and sustainable urban areas.

Originally, the idea was to explore the urban living lab concept by creating and managing two living labs, one in the Liesing suburb of Vienna and the other in Stockholm (in the suburbs Årsta and Östberga). Thus, the project was conceived of as more than research from a distance; it would also include active involvement in developing new forms of urban planning and governance. Both living labs were adapted during the project's lifespan. The Stockholm living lab was revised to become a co-operative project with the Färgfabriken exhibition centre and their urban development and art exhibition Experiment Stockholm. Given the established partnership with Färgfabriken throughout the CASUAL project, this appeared to be a promising opportunity to study the exhibition itself as a living lab, as it raised a number of urban development issues, methods and cases. In addition, the exhibition used both art and urban planning methods to experiment with the future development of Stockholm.

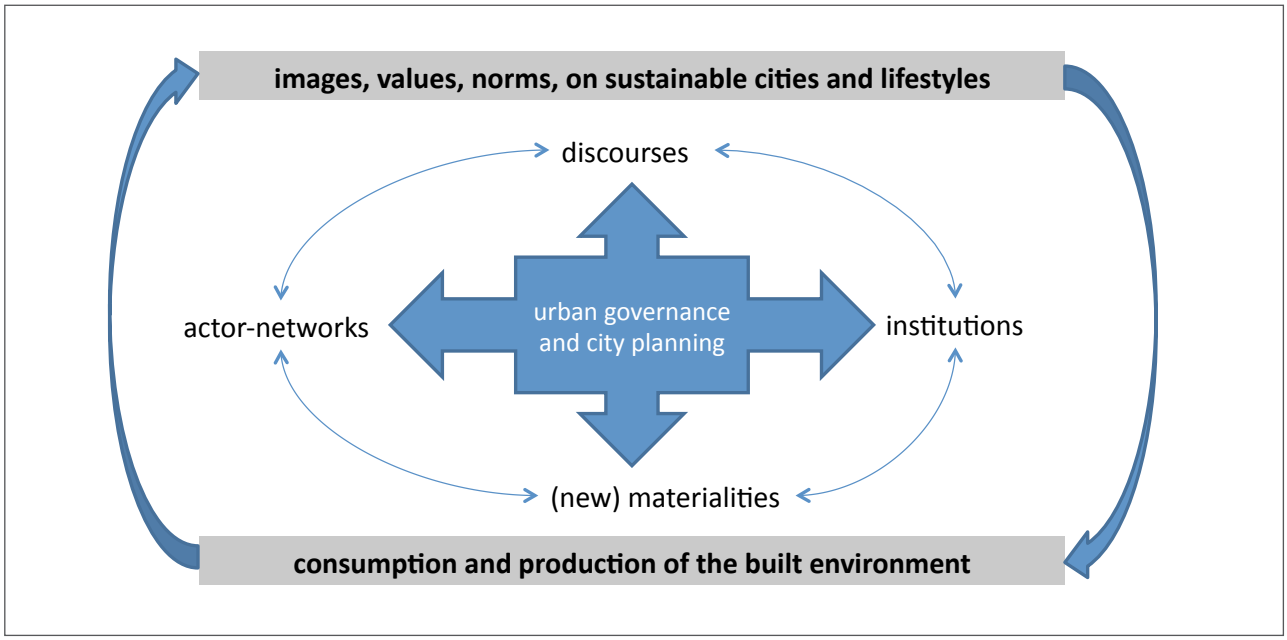
In the Vienna lab, the original idea was to study the effect of urban gardening on the mobility behaviour of existing and incoming residents. This focus was revised because of limited progress in the construction of new urban gardening projects. Additionally, a survey conducted during the course of the project showed that the provision of urban gardens does not play a prominent role in individual mobility patterns; rather, it is the provision of green spaces in general that is important. Therefore, we decided to focus on the mobility behaviour of Liesing's residents for the Vienna Urban Living Lab.

1.3. Research activities

The research was organized into work packages, the first of which was concerned with developing the conceptual framework for sustainable urban development, governance and living labs. The second work package was an empirical examination of transit-oriented development, mobility patterns and housing redevelopment. The third and fourth work packages focused on the urban living labs in Vienna and Stockholm, respectively, and the final work package was concerned with synthesis and dissemination activities.

This project has produced conceptual, empirical and practical results on: sustainability in planning and urban development; sustainable lifestyles, housing and mobility; and inclusive governance and urban living labs. The outputs include internal working papers[1], policy briefs, conference papers, journal articles and workshop contributions (see appendix). In the following sections, the main conclusions are presented under three thematic headings: (i) Sustainable urban areas and lifestyles; (ii) Urban development and transportation; and (iii) Urban living labs.

Figure 1 *CASUAL conceptual framework*



1 Some of these working papers have been submitted in revised versions to international peer-reviewed journals; others are available online.

2. Sustainable urban areas and lifestyles

2.1. The role of participation and sustainable lifestyles in urban policy[2]

To promote sustainable behaviour, sustainable spatial planning policies should give equal weight to the structures shaping the production and consumption of the built environment on the one hand, and to the agency of actors that continually use, consume and reproduce it on the other hand. This study synthesizes how the concepts of 'sustainable city' and 'lifestyle' are addressed in different urban policy documents in Europe, targeting the development of 'housing and living' as well as 'mobility and transport'.

Based on the hypothesis that public participation in the development of strategic urban planning documents enhances the awareness of 'lifestyles' that facilitate 'sustainable cities' on the one hand, and that it helps politicians and city administrators to understand citizens' 'lifestyle decisions' on the other hand, we also examined the role of participation in urban policy documents.

In addition, we analysed particular projects and strategies in Stockholm and Vienna, focusing on the role of participation and the ability of these projects to co-create sustainable lifestyles. We also examined the use of images and slogans with respect to target groups and lifestyles.

The aim was to contribute to an understanding of the different approaches to sustainable urban policy in European cities. To this end, the analysis illustrates how the production and consumption sides in cities (or city-regions) are addressed in different policy documents. This is exemplified by eight city-regions in the Netherlands, Austria and Sweden. Because policies are integrated vertically as well as horizontally, the analysis also includes EU and national policy documents. The investigation had the following two objectives

- First, to analyse how policy designs and groups of measures, communication and participation processes are formally integrated into strategies that influence consumer behaviour.
- Second, to examine how open traditional top-down policies are to innovative bottom-up approaches and to see whether such approaches can influence strategic policy-making.

Research questions and methods

We addressed the following set of general research questions in our analysis of the policy documents.

- How are categories of instruments combined into bundles to mediate between consumption and production, including measures that engage, encourage and enable sustainable consumption behaviour?
- How do policies target a specific audience with a specific message that comports with the lifestyle group that is addressed?
- To what extent do policies allow stakeholders and actors to be engaged through participatory and otherwise engaging instruments?
- How do policies include non-standardized approaches to integrate behaviour and consumption into strategic policy practices on the citywide level?

This work is based on an analysis of the primary sustainable policy documents in selected cities in Sweden, Austria and the Netherlands. Because these policies present the main course of urban policy at the city level, a more in-depth analysis was devoted to groups of measures and projects initiated during the validation of these overall development strategies. These analyses were complemented by interviews.

2 Responsible partner: Austrian Institute for Spatial Planning (OIR).

Main results

The research findings can be summarized as follows:

- All of the comprehensive plans were characterized by similar ambitions to reduce negative consequences for the environment. Dimensions of improvements in air quality, green spaces and public areas, recycling and treatment of waste and wastewater, heating and cooling were recurrent topics in the documents that we analysed.
- Production played a dominant role in all of the policy objectives, as the provision of the built environment was the main goal of the policies that we analysed. Consumption was addressed to a lesser extent.
- The social dimension was addressed through strategies:
  - concerning the use of open spaces and/or intending to improve neighbourhood relations, and
  - fostering 'affordable housing', which were adjusted to strategies fostering 'adaptable housing' for certain lifestyle groups and needs. Although this indicates a shift to incorporate an appreciation of consumer perspectives in social infrastructure provision, with a few exceptions, there was a marked absence of sustainability dimensions in relation to urban social policy.
- Mobility behaviour was addressed with respect to the reduction of greenhouse gas emissions in transport. Fostering ecologically friendly transport modes was mentioned, but the key measures that were presented frequently focused on infrastructure provision.
- All of the comprehensive plans that we analysed had intended to foster economic development through variations of an 'amenity-driven growth' model. The Dutch strategies that we analysed gave particular importance to the quality of sustainable infrastructures as attractors of outside investment. In some plans, the infrastructures that they described could indeed be characterized as a set of 'consumptive amenities'; that is, they were infrastructures that would make cities more enjoyable and attractive to user groups with particular consumption preferences. Some comprehensive plans (especially the Austrian strategies that we analysed) did not incorporate sustainability as an objective to address particular lifestyle groups. Sustainable infrastructures are in this regard being conceived less as 'consumptive amenities' than in other cities.

It must be stated that we found almost no explicit objectives to foster sustainable urban development through behaviour change at the broad strategic levels of the citywide plans that we examined. However, at various points in the documents that we analysed, the authors acknowledged the different lifestyles of their cities' inhabitants and indicated the need for information about the inhabitants' consumption behaviour. In addition, all of the policy documents included principles such as compact development, public transport accessibility, mixed-use development and social greening. In particular, mixed-use development was seen as a prerequisite to creating an attractive, 'vibrant' city, and authors indicated that social greening would facilitate 'social cohesion', be it between different groups (young and old) or among people with different social backgrounds. Interestingly, the main use conflicts between social groups were not discussed in these documents, such as demands for quiet and safe recreational green spaces by elderly inhabitants versus younger inhabitants' demands for more active play zones.

An important conceptual difference was noted in Stockholm, where education and labour market issues are included within realm of strategic urban planning. This partly reflects the severe problems with segregation in certain areas of the city and the desire to break up the existing structures but also a comprehensive planning tradition. On the other hand, in the past few decades, Vienna has relied on social housing and subsidized housing to ensure social integration. Although social and cultural integration are strongly related to housing, they are not mentioned in the policy documents that we examined, even though a lot of effort and money are devoted to these goals.

The integration of stakeholders in urban planning documents

The analysis of the integration of stakeholders during the policy-making process provided ample evidence for the growing awareness that sustainable, cross-sectoral planning can only be successful if the relevant stakeholders responsible for the implementation are working together from the start. However, this awareness does not always lead to the strategic integration of all of the relevant stakeholders. Although the integration of diverse social and cultural perspectives in strategic policy-making processes was stated as a goal in the policy documents of all of the countries that we examined, these documents have not led to new institutionalized forms of strategic partnerships at the citywide level. When such partnerships occur, there is some indication that they are treated as exceptional project-led events, below the radar of strategic policy-making.

There were some notable contrasts in the representation of the policy process in the documents that we examined.

- Some strategies incorporate social and cultural parameters through the involvement of a diverse set of interest groups and civil society actors. Contrasts are visible when it comes to the integration of NGOs and external interest groups. In some cases, such as Stockholm's RUFS[3] or Amsterdam's SEAP[4], the involvement of external interest groups and NGOs was integral to the decision-making processes of strategic policy documents. This stands in marked contrast to the Viennese strategies that we examined, in which external interest groups were, at best, consulted.
- New institutionalized forms of partnerships are hard to detect in strategic policy documents. We found some evidence for differential cultural impact on the demarcation of stakeholders in policy. In Sweden, such impacts were said to contribute to discursive blurring, whereas in Austria, a persistent separation between levels of government was claimed. Rhetorically, at least, this contrast can be used to differentiate between degrees of integration, from policy integration models that are based on inter-sectoral integration, as in Vienna, to models that follow a trans-sectoral approach, as in Stockholm and Amsterdam.

Although participatory tools may have the ability to shift values towards more sustainable consumption of the built environment, the use of such tools does not always directly target effective changes in behaviour. Formally speaking, participation was part and parcel of the policy documents that we examined. In particular, this involved tools that were used to increase levels of participation, such as media campaigns, the use of networks, community actions, workshops and think tanks that engaged citizens. Nevertheless, participation techniques at the local level or the project level were used to try to change values by giving information or by creating awareness via education.

National differences and common ground

Only two policy papers, one from Austria and one from the Netherlands, involved citizens as co-decision-makers. None of the papers addressed the levels of shared decision-making in the elaboration of the policy. Politicians, city administrators and local consultants still set the frame for urban development. However, the policy plans that we analysed made use of public participation in various ways and to various extents. The limited analysis of policy papers makes it difficult to identify differences or focal points in the use of participation.

As mentioned previously, cities are rather hesitant to involve citizens in formal binding roles in policy papers at the city level (at such a broad spatial scale). However, for the implementation of concrete measures or policies at the city quarter level, citizens are more often able to participate in shared decision-making or even to make decisions. The willingness to tackle the cultural roots of consumption practices increases with more local (i.e. city quarter level) policy measures..

The attitudes and approaches that governments take in their interactions with citizens and stakeholders differ across countries. The concept of partnership is omnipresent in Dutch and Swedish strategies. It may be that when governments are seen as partners of citizens and stakeholders, they are better able to manage participatory processes. The following formulation made in SEAP Rotterdam illustrates this 'Nordic attitude': 'The city does not have to take the lead in everything. That would only result in us frustrating and even jeopardizing countless initiatives that are already being implemented. The role of the city government is primarily that of a partner. Where necessary, we will help our partners by creating the required conditions and removing obstacles and, where desired, we can gently push matters in the right direction for the benefit of joint interests.'[5]

In all countries, the intensity of citizens' involvement increases as policy papers evolve over time. This differs greatly from stakeholder involvement. Stakeholders are more involved from the beginning until the end of policy evolution, whereas most strategies only involve citizens in the middle, at the end or even after the evolution of policy papers. This allows us to conclude that although certain cities show high levels of involvement, citizens are not necessarily involved at all stages of the policy-making process.

Individual cases and specific conclusions

- The City of Amsterdam is not afraid to use innovative technologies and social media in the development of comprehensive plans. With 'Amsterdam binnen 30 minuten', a great number of very different people were able to participate in an efficient way, and at the highest level of participation identified in the analysed documents: 'involvement'. This approach to participation seems promising, but Am-

3 Stockholm Office of Regional Planning (2010). *Regional development plan for the Stockholm region – RUFS 2010*. Stockholm.

4 City of Amsterdam, Klimaatbureau Amsterdam (2009). *Amsterdam: a different energy. 2040 Energy Strategy.*

5 City of Rotterdam (2011). Investing in sustainable growth. *Rotterdam Programme on Sustainability and Climate Change 2010–2014*. Rotterdam.

sterdam is an exception; it seems that many city governments still need to overcome their inhibitions.

- Differences occurred in the types of policy documents that we analysed. SEAPs seemed more likely to limit participatory processes to the level of 'awareness raising', whereas classical policy documents generally went at least a step further.
- In general, participatory processes were not addressed to specific target groups or lifestyles. However, at the level of awareness raising, there was a focus on educational measures. Because awareness raising explicitly refers to a change of behaviour, 'young people' might be the target group, as they will be the future users of the city's infrastructure, etc.
- Increasing importance of citizens' councils: The Austrian cities of Graz and Vorarlberg successfully launched citizens' councils. Vienna also had a similar workshop, which at present can be only seen as a pilot project rather than as a regular instrument of participation. However, it seems that in the German-speaking regions, this 'good practice' example might spread further.

Relative to Austria, participatory processes occupy a more central role in the Dutch and Swedish policy strategies. However, the level of discursive commitment and the actual level of citizen involvement in the development of strategies are not necessarily correlated. Although certain Dutch and Swedish cities are generally better at communicating the openness of their strategic processes through policy documents, Austrian policy strategies also incorporate participatory processes, even though the topic of participation does not seem to be that important in the planning discourse hierarchy.

Having examined two policy sectors in which the question of fostering behaviour change plays a dominant role across Austria, the Netherlands and Sweden, we will provide some tentative conclusions in several areas from this macro analysis of comprehensive plans:

The willingness to change consumption patterns associated with housing and living, and mobility and transport. Certain strategies across these two sectors were more prepared than others, at least rhetorically, to engage the question of behaviour change through a grouped set of measures. An example is Rotterdam, where considerations for behavioural change were not supplementary, such as in the Housing part of Vienna's KLIP II[6], but were an integral element of sustainable policy-making in the sectors that we examined.

Images of city living conveyed in policy strategies. An evaluation of graphic material showed that some strategies were more interested in relating infrastructure, mobility and housing to the daily routines of city inhabitants. In general, we can say that Dutch and Swedish strategies were more likely to target citizens and non-specialist stakeholders than were other strategies.

The balance between consumption and production measures in the two sectors. Although behaviour change in most strategies was dominated by an infrastructural perspective, it was shown that strategies that foster consumption and behaviour change were much more fully developed in the mobility and transport sector than in the housing and living sector. Policies related to mobility and transport showed a greater integration of measures into groups of production and consumption side interventions, with the question of information and awareness playing a predominant role in fostering sustainable mobility. Similar conclusions can be drawn with respect to the targeted nature of policies towards certain lifestyles and choices.

The targeting of measures in housing and living, and mobility and transport to specific user groups. Generally, lifestyle choices and types were not explicitly addressed in the particular groups of measures used for transport and mobility, and housing and living in the comprehensive policy plans that we examined for Sweden, Austria and the Netherlands. However, city plans did address different user groups and lifestyles. Although questions of lifespan, user type and living type are mentioned in some campaigns, these documents typically only provided input for information campaigns; they did not explicitly inform the discursive framing of infrastructure provision.

The analysis of measures and the relationships between measures and overall strategic plans at the citywide level indicated the following:

The examination of examples both confirmed and added nuance to the set of conclusions that we were able to draw based on our analysis of the citywide plans. Although the top-down approach that persists at the citywide level in Vienna and Stockholm was seldom informed by consumption and user lifestyle considerations, we observed a gap between a general set of policy measures that was mostly driven by eco-efficiency gains on the production side and a number of innovative projects that were informed by consumer perspectives and values.

At the same time, cities displayed a different relationship between local bottom-up projects and general policy. The Stockholm example of congestion charging and sustainable Järva showed how citywide policies

6 Magistrat der Stadt Wien, MDKLI (2009). *Klimaschutzprogramm der Stadt Wien. Fortschreibung 2010–2020.* Wien.

can integrate consumption and participatory tools (as opposed to Vienna's Parkraumbewirtschaftung). If innovative projects informed policy-making through the replication of other projects in Vienna, it is questionable whether they de facto informed policy practices. The example of Bike city is rather exceptional in this regard, as it effectively changed views in strategic citywide policy and informed policy practice. In comparison, from the outset, local pilot projects in Stockholm were guided by top-down policy in a deliberate choice to make them replicable in other areas. However, several other studies have shown that there is a lack of consistency in the application of standards across these projects.

Conclusions

In the course of this study, we have reviewed policy frameworks relevant to the 'production' of sustainable cities and those intended to influence lifestyles in several cities in the Netherlands, Austria and Sweden. We conducted this investigation with two analytical perspectives in mind.

- Identifying policy designs for types and groups of measures and for communication and participation processes and how they integrate strategies to influence consumer behaviour.
- The openness of traditional top-down policy paradigms to innovative bottom-up approaches, and the possibility for such approaches to influence strategic policy-making.

Our analysis of policy documents revealed several convergent and divergent tendencies, contradictions and similarities. At strategic policy levels, behaviour change was mostly addressed through the eco-efficiency of technological infrastructures. Although there were signs that policymakers acknowledged the need to understand the context in which unsustainable behaviour arises, urban infrastructures and their cultural contexts were still largely segregated in sustainable urban policy documents at the citywide level. Some strategies showed a willingness to relate urban infrastructures to everyday life through engaging language and rhetoric, and the provision of a greater degree of choice and flexibility vis-à-vis different lifestyles. Although we found some country-specific differences, with the Dutch and Swedish generally showing a greater concern for sustainable behaviour, national differences seemed to be more important at the level of policy documents than that of planning cultures.

The governance of sustainable consumption and production is marked by a gap between willingness and institutional capacities to integrate citizens and new perspectives. Although the policy documents in each of the countries that we examined called for the integration of diverse social and cultural perspectives in strategic policy-making, such sentiments have not led to new institutionalized forms of strategic partnerships at the citywide level in the cities that we examined. For instance, in the newest comprehensive plan for Vienna[7], which was recently adopted by the municipal council, strong efforts were made to involve stakeholders and to integrate the strategies of all municipal departments concerned. These attempts for stronger policy integration faced strong opposition within the political game of assigning and withdrawing (or sharing) competencies. A deeper understanding of this gap depends upon an understanding of institutional capacities that goes beyond the analysis of policy discourse and thus beyond the scope of this particular study.

Innovative approaches and projects at the local level are difficult to translate into overarching policy practices. For example, in both Stockholm and Vienna, municipal authorities have gone beyond the business-as-usual approach in certain instances, particularly when it comes to new development projects. However, these approaches are mostly limited to the project level, and there are difficulties in integrating such experiences into higher-order strategic documents or other projects. Similarly, in Vienna and Stockholm, practices that were tested in new projects were seldom extrapolated to higher-order policy contexts or shared with other projects. Nevertheless, based on the combined findings from our analysis of citywide strategies and groups of measures and projects, we believe that the following measurement policy options in the two cities that we examined have supported the spread of knowledge from project to strategic policy-making (in housing and living, and mobility and transport):

Making the effects of changed behaviour visible on a human scale: Strategic policies can do a lot to illustrate the effects of infrastructure systems at the human scale. The use of graphic material and engaging heuristics can help to achieve this. Effective information campaigns and innovative instruments for visualizing information are potent means of communicating the positive effects of changed behaviour. The use of new technologies such as apps and social media can also be powerful tools for making the effects of change visible.

Targeting specific lifestyles without stigmatizing them: New participatory approaches can be used to target certain segments of the population and to improve

7 MA 18 – Stadtplanung und Stadtentwicklung (2015). STEP 2025 Stadtentwicklungsplan, Wien.

the design of policy measures. If they increase the probability of impacts on sustainability, they must be combined with existing production measures and technologies to increase the chances of citywide impacts. In terms of the population, they have to include both pioneers of sustainable consumption and participants using conventional approaches, allowing the latter to learn from the former. Sustainable consumption policies must allow for learning, instead of segregating different lifestyle groups.

Integrating key individuals as important drivers of integration into citywide strategies: To ensure that piloted approaches and bottom-up initiatives influence citywide practices, such measures must be supported by key partners and others capable of assembling the right partners at the citywide level. We recommend starting with scientifically evaluated pilot projects and extending successful schemes to the citywide level to demonstrate exemplary behaviour to others.

There are notable differences between the housing and living, and mobility and transport strategies that we examined. Although most strategies address behaviour change from an infrastructural perspective, strategies that foster integrated production and consumption are more well developed in the transport and mobility sector than in the housing and living sector. Across all of the policy strategies that we examined, the transport and mobility sector showed greater integration of measures into sets of production and consumption interventions, with the question of information and awareness playing a predominant role in fostering sustainable mobility. We have seen the integration of different policy areas in principles of mobility and transport, whereas housing and living have remained more segregated. Similar conclusions can be drawn with respect to the targeting of policies towards certain lifestyles and choices. In general, in the comprehensive policy plans of Sweden, Austria and the Netherlands that we examined, lifestyle choices and types are not explicitly addressed by the sets of measures used in the transport and mobility, and housing and living sectors.

When many policy strategies at the citywide level were committed to participation and the integration of citizen perspectives, the degree of citizen participation varied between strategies that we examined. Sustainable urban development policies in the cities that we examined showed a contrasting role for citizens in the making of policies. In some strategies, citizens were co-decision-makers, whereas in others, they were simply consulted. Among strategies that used a standard set of instruments to organize participation, some strategies employed innovative tools that made use of a network and a horizontal understanding of the policy process. The general political aim to integrate citizens more fully into urban development decisions was challenged by the ability and willingness of the local actors to approach the local population and to share decision-making responsibilities. Analyses of the Local Agenda 21 and the Local Area Management policy (Grätzl-management) in Vienna indicated that the general ascent of relational concepts of sustainability and local consumer perspectives coexisted with traditional conceptions of 'passive' citizenship and top-down ecological modernization.

Although sustainable urban development policies try to promote greater collaboration among different administrative bodies, they are embedded in environments in which policy actors are traditionally segregated. Similar conclusions can be made for Stockholm, even though the policy discourse there promotes the wider integration of citizen views and perspectives in planning.

2.2. Planning for sustainable lifestyles and housing[8]

Changing urban conditions and lifestyles require new forms of urban policy-making and planning. In this study, we outline a research agenda for investigating the intersections between urban development and sustainable lifestyles through a practice-oriented approach. More specifically, this study explores how contemporary urban planning can contribute to sustainable lifestyles in an era of neoliberalism and individualism by engaging with everyday practices. To understand why many sustainability initiatives fail (or do not proceed as planned), many researches have turned to practice theories. Theories of practices have potential for studying the interaction between planning and everyday life and for understanding the roles of different actors in the implementation of policies. Practice theories regard practices and the active agency of all actors as both discursive and material, and thus we consider such theories to be particularly relevant for studying urban governance and planning, as they allow us to consider the active role of the inhabitants as well as the spatial and material aspects of living. A practice-oriented approach can be fruitful for studying lifestyles in relation to urbanism and planning and can provide a basis for considering the spatiality of everyday life. In addition, a practice-oriented approach can help us to shift attention away from the discourse of sustainable living as the responsibility of the individu-

8 Responsible partner: Nordregio.

al; that is, it can help us to get beyond a simplistic focus on either individual- or system-level solutions.

Research questions and method

The study is a review of recent research developments in housing and lifestyle studies from an urban planning perspective. The focus is on two main research questions: 1) what are the challenges and possibilities for planning to promote sustainable lifestyles?; and 2) what seem to be the most suitable ways to study the interrelationships between planning and sustainable lifestyles?

Main results

Lifestyles have been given a key role for achieving sustainable consumption and production patterns. In 2005, a Task Force on Sustainable Lifestyles was established as part of the Marrakech Process. The task force is intended to facilitate the Johannesburg Plan of Implementation, which was a product of the World Summit on Sustainable Development in 2002. One result of the task force was a fluid but rather radical definition of sustainable lifestyles that emphasizes the need to rethink 'our ways of living, what we buy and how we organize our everyday lives', which also means 'altering how we socialize, exchange, share, educate and build identities' and requires 'transforming our societies and living in harmony with our natural environment'.[9]

Changes in individual lifestyles and consumer practices are increasingly seen as a way to address sustainability challenges, and the importance of individual consumption choices in promoting sustainability is emphasized by both policymakers and the media. This emphasis has been related to more general individualization tendencies as well as to changes in government in which solutions to environmental issues are increasingly framed as individual lifestyle responsibilities rather than the responsibility of the state or corporations.[10] Naturally, framing environmental solutions as the responsibility of the individual has implications for the potential role of planning in promoting sustainable lifestyles.

However, there are significant challenges to planning sustainable lifestyles in a neoliberal era. The case of the Stockholm Royal Seaport is an excellent illustration of the limits of planning for sustainable lifestyles. The Stockholm Royal Seaport is a large-scale, mixed-use, environmental flagship urban development project. When it is completed in 2030, it will have 12,000 new apartments and 35,000 new offices. The planning of the area is explicitly aimed at promoting sustainable lifestyles by making it easy to be environmentally responsible (Swedish: lätt att göra rätt). The plan's programme outlines both visions and goals for sustainable lifestyles. As an example, one of the plan's concrete measures was an introductory programme for new residents that includes a 'Living School' (Swedish: Boskola) on sustainable living and lifestyles. Another measure includes developing a rental system for cars, as well as other capital investments. Construction began in 2010, and in the same year, a news article that highlighted the ambitious and extensive environmental programme of the project spurred a public debate about the limits of planning.[11] The project received strong criticism for trying to manage issues that were considered to be private and that belonged to the sphere of individual choice.[12] Some critics regarded it as (a revival of) social engineering.[13]

Housing studies: from surveying to understanding

Housing preferences and living choices are often studied through structural approaches and survey analyses in which people are grouped into different lifestyle typologies. However, studies on housing satisfaction and preferences often have many limitations that impact on the results and the possibilities for understanding the relationships between the lives and the wishes of the inhabitants on the one hand and planning on the other hand. For example, the respondents' financial restrictions are seldom discussed in these kinds of surveys. They usually focus on the respondents' dreams, independent of their monetary resources and their willingness to invest their income in housing.[14] Furthermore, issues related to the values that underlie housing preferences are rarely studied, such as why respondents have certain types of preferences and wishes, and what kinds of ideologies and values contribute to their housing preferences. Being able to identify the factors that

9 Task Force on Sustainable Lifestyles. (2010). UNEP (United Nations Environment Programme). p. 9.

10 Dahl, E. (2014). Om miljöproblemen hänger på mig. Individer förhandlar sitt ansvar för miljön. Göteborg & Stockholm: Makadam.

11 Tottmar, M. (2010, November 9). Press på boende om sund livsstil. *Dagens Nyheter.* Stockholm.

12 Högström, E., Wangel, J., & Henriksson, G. (2013). Performing sustainability: institutions, inertia and the practices of everyday life. In J. Metzger & A. Rader Olsson (Eds.), *Sustainable Stockholm: Exploring Urban Sustainability in Europe's Greenest City* (pp. 147–167). New York: Routledge.

13 Björkman, J. (2012). Sociaingenjörs-konstretro. *NEO,* (6).

14 Lapintie, K. (2010). Intohimon hämärä kohde. Y*hdyskuntasuunnittelu* 2010:2, 41–57.

underlie respondents' preferences for owner-occupied housing, for example, could provide planning insights that lead to the creation of different types of attractive and sustainable housing forms and options.[15]

For example, a qualitative study has shown that preferences for owner-occupied detached housing are closely related to experienced independence and autonomy, which increase the possibilities for influencing one's living environment but also for acquiring both mental and physical space and regulating the relationships between 'own' space and the surrounding social and physical environments.[16] By considering that a need for sovereignty may often underlie preferences for detached housing in suburban areas, we might be able to reconcile stated preferences with planning objectives. This study suggested that instead of focusing on 'high quality housing' in dense areas, it could be beneficial to consider the possibility of building flexible and adaptable housing and living environments to respond to the need for sovereignty.

Thus, it is important to move beyond simplified ways of analysing the relationship between the inhabitants' wishes and the goals of urban planning. Quantitative surveys must be complemented with qualitative approaches to acquire a better understanding of the values and practices that underlie preferences. Furthermore, it is questionable whether lifestyle typologies provide more insights than traditional variables (socio-demographics), especially as there are numerous typologies and no consensus about the term 'lifestyle'.[17] However, the renewed interest in lifestyles has coincided with emergence of the sustainability debate.

Lifestyle and theories of practices

Since the 1990s, there has been a renewed interest in the concept of lifestyle in sociology and consumer studies.[18] Lifestyle studies have also developed in other directions, away from lifestyle typologies and towards life(style) politics, which directly engage with issues of sustainability.[19] As introduced by Spaargaren, 'life(style) politics are as real and important as other, traditional forms of (emancipatory) politics. When it comes to changing deeply engrafted patterns of consumption in modern consumer societies, life(style) politics can be shown to be even more powerful and effective in some respects when compared to traditional forms of politics'.[20]

Spaargaren also makes an explicit link between lifestyle and theories of practices,[21] which offer a number of interesting possibilities for researching consumption and developing policies to facilitate more sustainable lifestyles.[22]

Theories of practice, or practice theory as an approach, have been increasingly applied in the social sciences, and they draw on different strands of research that have developed throughout the 20th century.[23] Practice theory is actually a family of theories ('theories of practice') that generally aim to move beyond dichotomies such as theory/practice, science/politics, discourse/action and global/local. It emerged from dissatisfaction with both structuralist and post-structuralist theories' ability to engage with, and to grasp the complexities of, contemporary society. Overcoming or moving beyond structure–agency dualism presents interesting possibilities not only ffor research but also for policy, which has often been polarized by focusing on either individualist solutions (i.e., micro-level behavioural change of consumers through information and persuasion) or systemic solutions (i.e., macro-level changes through socio-technical innovation and regu-

15 Lapintie, K. & Hasu, E. (2010). 'Asumisen monet kulttuurit'. In *A. Juntto (Ed.), Asumisen unelmat ja arki. Suomalainen asuminen muutoksessa.* Gaudeamus Helsinki University Press, Helsinki. 151–176.

16 Lapintie, K. (2008). Ilmastonmuutos ja elämän virta. Y*hdyskuntasuunnittelu*, 2008:1, 24–39.

17 Jansen, S. J. (2011). Lifestyle method. In S. J. Jansen, H. C. Coolen, & R. W. Goetgeluk (Eds.), *The Measurement and Analysis of Housing Preference and Choice* (pp. 177–202). Dordrecht: Springer.

18 Hetherington, K. (2011). Lifestyle. In D. Southerton, *Encyclopedia of Consumer Culture*. Thousand Oaks, CA: SAGE Publications, Inc.

19 Spaargaren, G. (2011a). Life(style) politics. In D. Southerton, *Encyclopedia of Consumer Culture*. Thousand Oaks, CA: SAGE Publications, Inc.

20 ibid. p. 855ff.

21 Spaargaren, G. (2011a). Life(style) politics. In D. Southerton, *Encyclopedia of Consumer Culture*. Thousand Oaks, CA: SAGE Publications, Inc.; Spaargaren, G. (2011b). Theories of practices: agency, technology, and culture. Global Environmental Change, 21(3), 813–822.

22 See e.g., Shove, E. (2010). Beyond the ABC: climate change policy and theories of social change. *Environment and Planning A*, 42(6), 1273–1285; Shove, E. (2012). Putting practice into policy: reconfiguring questions of consumption and climate change. *Contemporary Social Science,* 1–15; Shove, E. & Walker, G. (2010). Governing transitions in the sustainability of everyday life. *Research Policy,* 39(4), 471–476; Spaargaren, G. (2003). Sustainable consumption: a theoretical and environmental policy perspective. *Society & Natural Resources,* 16(8), 687–701; Spaargaren, G. (2011b). Theories of practices: agency, technology, and culture. *Global Environmental Change*, 21(3), 813–822.

23 Schatzki, T. R., Cetina, K. K., & Von Savigny, E. (2001). *The Practice Turn in Contemporary Theory*. London & New York: Routledge.

lation of producers).[24]

Even without a unified practice approach but with a diversity of (possibly contradictory) theoretical perspectives, Schatzki concludes that the 'field of practices' is the common denominator and that practice theory can be described as 'all analyses that (1) develop an account of practices, either the field of practice or a subdomain thereof (e.g. science), or (2) treat the field of practices as the place to study the nature and transformation of their subject matter'.[25]

It is important to recognize that practice is not the same as behaviour. There are different interpretations of practice, such as weak and strong interpretations of practice.[26] The former is represented by Spaargaren's notion of practices as sites for the interaction of consumption and production, whereas the latter is represented by Reckwitz's stronger interpretation of practices. According to Reckwitz, a practice can be seen as 'a routinized type of behaviour which consists of several elements interconnected to one another: forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge'.[27] These two interpretations can also be understood in terms of their differing emphasis on the material dimension of social practice,[28] which also relates to the debate about post-humanism within theories of practices.[29]

Practice theory has been found to be useful in empirical studies of the potential for more sustainable technology in housing and in studies that try to understand the relationship between technology and its users.[30] As an example, an empirical study of how municipalities work towards sustainable urban development concluded that policy measures need to have a comprehensive approach that takes into account the different elements of practices (identified as know-how and embodied habits, institutional knowledge and explicit rules, engagements, and technologies) and design measures that address these different elements in a coordinated manner.[31] Another practice-oriented study on reducing household energy consumption concluded that home renovation schemes may be inefficient if social practices are not considered and if policies are incompatible with desires to create the ideal home. The study also concluded that policies should be 'creating new aspirations and challenging old ones'.[32] In a similar manner, Shove argues that environmental policy should approach the phenomenon that it addresses as socially and culturally specific practices instead of lifestyle choices.[33]

Conclusions

For sustainable urban development, it is evident that focusing on the urban form (the compact city) or technological solutions (e.g., smart meters or energy renovations in homes) is insufficient. However, the usefulness of various kinds of information campaigns to promote more environmentally friendly individual behaviour and consumption can be questioned.[34] To understand why many sustainability initiatives fail, many authors have begun studying everyday practices and lifestyles. The study of practices can help us to understand the roles of different actors in implementing policies. Most importantly, practice theory approaches consider people as active agents whose practices shape and are shaped by policies (among other things) and discourses, but people are also shaped by the material urban environments and buildings that they inhabit.

Practice theory rejects the view of inhabitants as

24 Spaargaren, G. (2011b). Theories of practices: agency, technology, and culture. *Global Environmental Change*, 21(3), 813–822. p. 814.

25 Schatzki, T. R. (2001). Practice theory. In T. R. Schatzki, K. K. Cetina, & E. Von Savigny (Eds.), *The Practice Turn in Contemporary Theory* (pp. 10–23). London & New York: Routledge. p. 11.

26 Shove, E. (2010). Beyond the ABC: climate change policy and theories of social change. *Environment and Planning A*, 42(6), 1273–1285.

27 Reckwitz, A. (2002). Toward a theory of social practices: a development in culturalist theorizing. *European Journal of Social Theory,* 5(2), 243–263. p. 249.

28 Spaargaren, G. (2011b). Theories of practices: agency, technology, and culture. *Global Environmental Change,* 21(3), 813–822.

29 Schatzki, T. R. (2001). Practice theory. In T. R. Schatzki, K. K. Cetina, & E. Von Savigny (Eds.), *The Practice Turn in Contemporary Theory* (pp. 10–23). London & New York: Routledge.

30 For example, Gabriel, M. & Watson, P. (2013). From modern housing to sustainable suburbia: how occupants and their dwellings are adapting to reduce home energy consumption. *Housing, Theory and Society,* 30(3), 219–236.

31 Jensen, J., Christensen, T., & Gram-Hanssen, K. (2011). Sustainable urban development: compact cities or consumer practices? *Danish Journal of Geoinformatics and Land Management*, 46(1), 50–64.

32 Maller, C., Horne, R., & Dalton, T. (2011). Green renovations: intersections of daily routines, housing aspirations and narratives of environmental sustainability. *Housing, Theory and Society,* 29(3), 255–275. p. 273.

33 Shove, E. (2010). Beyond the ABC: climate change policy and theories of social change. *Environment and Planning A*, 42(6), 1273–1285. p. 1280.

34 Shove, E. (2010). Beyond the ABC: climate change policy and theories of social change. *Environment and Planning A*, 42(6), 1273–1285.

solely passive 'consumers of space'. It seriously tries to understand the roles of the various elements of everyday practices and how they influence and are influenced by the limits of planning. Researchers who use and develop practice theory emphasize that it is not a distinct theory as such; it is more of an approach to overcome 'structure–actor dualism'[35] that allows us to consider embodied practices that are socially located in discourse and meaning, and thereby consider a house (for example) as both a discourse and a material object that influences practices and meanings.[36]

Materiality and interactions between human actors and non-human objects are central to practice theory, even though there are differences in how and whether material aspects such as technology are included in practice theory discussion. As outlined above, studies on housing, technologies and consumption, in particular, draw on practice theory approaches that focus on how material aspects and technologies shape and are shaped by the everyday practices of inhabitants. A research focus on practice can directly inform urban policies and planning for sustainable areas and lifestyles beyond simplistic one-sided individualistic or systemic solutions. However, it is still important to include the 'the broader geopolitical and geoeconomic dimensions of contemporary urbanization processes and associated forms of worldwide capitalist restructuring, dispossession, and uneven spatial development'.[37]

2.3. Envisioning sustainable lifestyles in Stockholm's urban development[38]

The objective of this study was to investigate and to analyse critically the various images, ideas, values and norms that are associated with the notions of sustainable city and sustainable lifestyles in contemporary urban planning. How are sustainability and sustainable lifestyles framed and communicated? How do planning visions or processes encourage certain ways of life? Do they encourage sustainability, and if so, how? What norms and values are constructed and communicated in the planning process? The focus of the investigations was the plans and the planning process for a new development in an area called Årstafältet in Stockholm, Sweden (see Figure 2).

Research questions and methods

The study focused on the following:

- The urban and sustainability visions for the new area: what is planned and how can the plans be understood in the context of planning in Stockholm and Sweden, as well as the previous development in Årstafältet?
- The planning process, the actors involved, and governance: which actors are involved, and what are their relationships and resources? How are citizens included in the planning process? What values do the different actors bring to the process, and are there value conflicts?
- The discursive constructions of sustainable lifestyles, sustainable urban planning and development: what is a sustainable lifestyle in Årstafältet? How are Årstafältet as a place and the envisioned life there discursively constructed in the plans and visions? How does planning operate discursively?

In investigating these research questions, we addressed both the production of the built environment (in the form of the planning process and how it is formalized in planning documents) and how planning expresses and tries to put into practice contemporary (and ideally sustainable) living preferences and lifestyles. The questions and themes that we focused on can contribute to a discussion of barriers and opportunities in promoting sustainable planning and lifestyles.

Main results and conclusions

We found a process that is characterized by a changed conceptualization of sustainability – from safeguarding green space to transforming it into a postmodern housing area. Sustainable urban development in Stockholm has changed from developing old brownfield areas to densifying and urbanizing existing green spaces. The planning vision for Årstafältet is an obvious example of how the division between city and suburb might have lost importance, even though it still lives on in planning and is associated with certain lifestyles.

35 Gram-Hanssen, K. (2011). Understanding change and continuity in residential energy consumption. *Journal of Consumer Culture,* 11(1), 61–78. p. 62.

36 Clapham, D. (2011). The embodied use of the material home: an affordance approach. *Housing, Theory and Society,* 28(4), 360–376.

37 Brenner, N. (2013). Theses on urbanization. *Public Culture,* 25(1 69), 85–114. p. 92f.

38 Responsible partner: Nordregio.

Figure 2 *Aerial view of Årstafältet from the southeast with the new proposed developments*[39]

In Årstafältet, sustainability was downplayed in favour of urbanity and social integration. However, social integration was to be achieved by physical means rather than through social projects.

The urban ideal can be used to legitimize neoliberal proposals.[40] This has made us reflect on its strategic use in Årstafältet and other Swedish urban development projects. Is it possible to see the urbanization of the suburb in Årstafältet as a neoliberal project? What is outdated about the post-war suburb? Is it another case of how the desire to decrease segregation actually cements it?

A compact city structure was thought to be needed to create a stronger basis for public transport and local services. There were allotments, greenhouses and a park, but urban gardening was not emphasized to any great degree. A sustainable lifestyle is an urban lifestyle and the compact city is the place for it. However, the envisioned lifestyles were only implicit in the images and choices of words. Judging from the planning process and vision, there was no strong vision of a new Årstafältet being an area for alternative lifestyles. It also appears as if the New Årstafältet was planned for a new group of people rather than for the people living in the area today, and for other activities than the ones ongoing. This has made us wonder why the current activities in the area were not considered to be attractive, which is interesting in relation to the history of Årsta. As one of the prime examples of the neighbourhood and community planning of the 1940s and 50s, the contemporary vision for Årstafältet is a contrasting one. If post-war planning was for the residents, and if it materialized values of local and collective organization (through its public places and community spaces), contemporary urban developments such as new Årstafältet appear to embody a different set of values. They emphasize the importance of visitors for public life, safety and attractiveness, and the planned public spaces are for recreation rather than collective organization.

Planning in Stockholm highlights the intimate relationships and tensions between (property) development and planning. Our detailed review of the planning process for Årstafältet shows how development issues actually preceded planning. It is an example of planning as land allocation and development, with a strong presence for the developers' and architects' visions. Although the architectural competition and

39 Source: City of Stockholm: http://bygg.stockholm.se/Alla-projekt/arstafaltet/

40 Brenner, N. & Schmid, C. (2013). The 'Urban Age' in question. I*nternational Journal of Urban and Regional Research*, 38(3), 731–1131.

the master plan for the area gave an initial vision and general idea of the development of the new neighbourhood, the allocation of land to developers has continually preceded the formal planning processes. In addition, although the planning process appears to have included citizen participation, it has been more in the form of protests than formal involvement and actual influence on decision-making or the plans for the area. There appears to have been some insecurity about what participation would be for, as 'everything' had already been decided by the developers when participatory practices were introduced. Furthermore, it is interesting to note that the idea of developing the new neighbourhood was initially contrary to the guiding municipal comprehensive plan. Overall, the Årstafältet planning process appears to have been one in which the planners, developers and architects worked in close collaboration. This raises questions about who the actual planner was in this collaboration and where the actual planning occurred.

2.4. Urban form, mobility and lifestyles: the example of Vienna–Liesing[41]

The aim of the study is to understand the linkages between housing form, mobility patterns and lifestyle, focusing on leisure activities. We analyse how the mobility behaviour of daily and leisure activities is linked to mobility and leisure orientations as well as to the availability of local recreational facilities and private or semi-private green spaces in the neighbourhood.

There are different definitions and measurements of the lifestyle concept in transport studies, as well as different views of how travel behaviour is influenced by lifestyles. Travel behaviour is one example of a behavioural pattern in which lifestyles are expressed. Thus, travel behaviour is not simply determined by price, speed and comfort; it can also be related to attitudes, status and preferences. Here, lifestyle is defined as a construct composed of individual activities, attitudes, interests, opinions and values that are expressed in certain leisure and mobility orientations and behaviours, among others.

Research questions and methods

The underlying hypotheses guiding the research on lifestyles and mobility patterns in this study assume complex linkages between lifestyle, social milieu, location and mobility. Lifestyle parameters influence residential choices, leisure activities and mobility behaviour (e.g., modal choice). People are most free to decide where to go and what transport mode to use when it comes to leisure activities (in contrast to trips related to work or education). Therefore, leisure trips are a suitable research object for testing the influence of lifestyle on mobility patterns. The following research questions were formulated:

- Is there a relationship between lifestyle and mobility patterns for leisure activities?
- Can sustainable mobility patterns be promoted by providing a certain leisure infrastructure? If so, what is needed with respect to local lifestyles?
- Can the provision of private, semi-private and public green spaces in residential environments influence mobility patterns?

We used a twofold approach to allow for an in-depth analysis of mobility patterns, orientations and lifestyles in Liesing, Vienna. First, a stated preferences survey was conducted to determine the respondents': a) housing situation, with special regard to housing form and green space availability; b) orientations to and opinions about leisure and travel infrastructure; c) leisure behaviour and use of certain leisure infrastructures; and d) their mobility patterns (primarily mode choice) for leisure activities. We interviewed 424 respondents by phone, covering a representative distribution of Liesing's inhabitants in terms of age, gender and housing type. The second part of the approach used the Communal Probes qualitative method with 20 Liesing inhabitants. This creative approach to capturing citizens' perceptions and opinions was designed to support the interpretation of the quantitative survey by providing a phenomenological perspective.

The construct of 'lifestyle' was developed from several elements that represent customary leisure activities: mobility orientations, leisure orientations and leisure behaviour. To operationalize mobility orientations and leisure orientations, we used preference ratings for certain infrastructure items related to transport and leisure in the neighbourhood. We solicited information about leisure behaviour by asking about the frequency with which respondents used leisure facilities. We measured mobility behaviour associated with work/training, shopping for daily needs, and leisure activities by asking respondents to indicate their preferred means of transport for each type of trip.

To test the hypothesis that lifestyle influences mobility patterns for leisure activities, we grouped individuals based on the elements described above. To construct 'lifestyle types', we used factor analysis and

41 Responsible partner: Austrian Institute for Spatial Planning (OIR)

cluster analysis to examine the questionnaire items associated with mobility orientation, leisure orientation and leisure behaviour.

Main results

The reasons that people develop particular mobility patterns are very complex. According to travel research, the main parameters that influence mobility behaviour are individual characteristics, and characteristics of the built environment. The urban form and the dispersion of urban functions are relevant, as is the transport infrastructure and its quality. The density, size and distribution of different urban functions (housing, workplaces, education, shopping, leisure, government, etc.) affect the distances that urban citizens, commuters, visitors, etc. must travel.[42] Furthermore, the transport infrastructure and the transport system are shaped by the urban configuration, and the existing transport infrastructure influences the development of the urban configuration as well. At the individual level, objective parameters such as socio-demographic characteristics have strong influences on mobility patterns. Subjective parameters associated with lifestyle, habits and environmental awareness are increasingly discussed in mobility research, even though it is unclear how empirically significant the explanatory potential of lifestyle parameters (goals in life, importance of spheres of life, values) is compared with the objective parameters.[43]

The cluster analysis that we conducted identified four 'lifestyle types', differentiated by characteristics on the basis of statistically significant deviations from the mean of all cases. To clarify their cluster-specific differentiation in terms of their mobility and leisure orientation and leisure behaviour, we labelled the clusters 'Suburban', 'Urban', 'Neighbourhood-oriented' and 'Ecological'. Several relationships between personal and household characteristics, housing situation, availability of green areas and private open spaces, and availability of transport modes and the lifestyle types became apparent.

Cluster 1 (Suburban, n = 102) represents respondents who have an affinity for car transport based on their preference ratings. People in this cluster rated infrastructure related to children, education, daily shopping, and services as very important, as well as green spaces in the neighbourhood. In contrast, they rated the neighbourhood infrastructure very negatively. Members of this cluster reported visiting private or public green spaces very frequently, and 80% of these 'Suburbanites' indicated that they had at least one car.

Cluster 2 (Urban, n = 69) represents respondents who have an affinity for public transport. People in this cluster ascribed low importance to leisure/sports facilities for all ages, services for seniors and community facilities as well as infrastructure related to children, education, daily shopping, services and green spaces in the neighbourhood. These respondents reported visiting arts, culinary and shopping facilities frequently. 81% of these 'Urbanites' indicated that they had at least one car.

Cluster 3 (Neighbourhood-oriented, n = 60) represents interviewees who rated all modes of transport as equally important and therefore can be labelled as multimodal. This cluster ascribed great importance to leisure/sports facilities for all ages, services for seniors and community facilities. The frequency of their visits to private or public green spaces and sports facilities was average, and the frequency of their visits to arts, culinary or shopping facilities was well below average. People in this group were likely to own a car (85%), and they had the lowest share of members without a driving licence (7%).

Cluster 4 (Ecological, n = 181) represents respondents who had a strong affinity for bicycle and walking infrastructure as well as for public transport. Their orientation towards cars was below average. People in this cluster assessed infrastructure related to children, education, daily shopping, services and green spaces very positively. Their leisure behaviour showed frequent visits to arts, culinary or shopping facilities, and they had an above average orientation towards sports facilities. Conversely, their orientation to private or public green spaces was low. 80% of the people in this cluster indicated that they owned a car, but they had the highest share of members without a driving licence (14%) in the sample.

170 respondents indicated the predominant mode of transport that they used to visit private gardens, terraces or community gardens, whereas 128 indicated the transport mode that they used for trips to public green spaces and free spaces, 86 for trips to sport facilities, 104 for trips to arts and cultural activities, 46 for trips to culinary arts activities and 82 for trips to a shopping malls or shopping streets. For some leisure trips, the sample sizes were very small, and therefore the results

42 Schremmer C., Mollay U., Neugebauer W., Novak S., Beiglböck S., Bory B., Panwinkler T., Schmitt P., Dubois A., & P. N. Galera-Lindblom (2009). SUME – Sustainable Urban Metabolism for Europe, FP7 Collaborative Research Project, Deliverable D 1.1. Urban development and urban metabolism: a spatial approach, Vienna.

43 See e.g., Hammer, A., Scheiner, J (2006). Lebensstile, Wohnmilieus, Raum und Mobilität – Der Untersuchungsansatz von StadtLeben, in: Beckmann, K., Hesse, M., Holz-Rau, M. (Hrsg.): *StadtLeben – Wohnen, Mobilität und Lebensstil, Neue Perspektiven für Raum- und Verkehrsentwicklung.*

are only suggestive. We compared the mode choices of the established lifestyle types with the mobility patterns differentiated by housing form to show relationships and to draw conclusions about the added value of the lifestyle concept for analysing mobility patterns.

The modal split for trips to private gardens or community gardens was due to the close proximity of private gardens to apartments and houses, and naturally a high percentage of these trips were made by foot (above 80% in all clusters). However, small differentiations are visible between the lifestyle clusters and by housing types.

Walking was also a popular mode of transport for public green and free spaces in all four of the lifestyle clusters (above 70%). Urban respondents reported the highest share of biking (12%) in the sample, whereas Neighbourhood-oriented respondents had the highest share of public transport use (13%) for this purpose. Interestingly, the Ecological group had the highest car use in the sample for these trips, with 20%. By housing type, the differentiations are smaller, with the share of car use being evenly distributed between residents of single-family homes and multi-storey buildings, with public transport only being used by residents of multi-storey buildings. Single-family homeowners reported the highest share of bicycle use to public green and free spaces, with 11%.

For leisure activities related to sports facilities, Suburban respondents had the highest car use (50%), Neighbourhood-oriented respondents reported the highest public transport use (35%), and Ecological respondents had the highest share of walking in the sample (52%). With respect to housing form, it was very clear that single-family home residents preferred car use (75%), whereas residents of multi-storey buildings used public transport (30%) and walking (73% for multi-storey buildings with more than six storeys) to go to sports facilities.

For all clusters and housing forms, public transport was the predominant mode of travel to arts and cultural destinations (50% or more, except multi-storey buildings with more than six storeys), but a significant percentage of people reported using cars (30% or more, except for the Neighbourhood-oriented cluster and people living in multi-storey buildings with more than six storeys). People in the Suburban cluster reported the highest share of car use for this activity (almost 50%) and the lowest share of public transport in the sample (also almost 50%). In all of the other clusters, the use of public transport was above 50%, and even above 60% (Multimodal clusters 3 and 4). For housing form, residents of single-family homes had the highest share of car use (46%), whereas townhouse and multi-storey building residents had the highest shares of public transport use (70%). Residents of multi-storey buildings with more than six storeys reported a very high walking share (42%) to arts and cultural destinations.

For trips to cafes, restaurants and clubs, travel was almost evenly split between walking, public transport and cars. Respondents in the Neighbourhood-oriented cluster most often walked (39%), took public transport (36%) and drove (21%) to these places. With respect to housing form, single-family homeowners reported an even split between public transport and car use (36%), and residents of multi-storey buildings had a higher share of walking (42%).

Trips to shopping malls and shopping streets were made by car (46%), public transport (28%) and walking (24%). People in the Urban cluster reported the highest share of car use (83%), followed by those in the Ecological cluster (50%). Respondents in the Neighbourhood-oriented cluster again showed the highest percentage of walking (26%) and public transport (36%) of all lifestyle types. Analysed by housing form, people living in single-family homes or townhouses reported higher car use for these trips (more than 55%) than did people living in multi-storey buildings.

There were significant differences between the lifestyle clusters for travel to work and training. The highest shares of car use were reported for people in the Suburban (51%), Urban (47%) and Ecological (44%) clusters. The highest shares of public transport to work/training were for the Neighbourhood-oriented (53%) and Urban (45%) clusters. Walking was highest among the Neighbourhood-oriented cluster, with 12%, whereas it was less than 10% in all other clusters. By housing form, the use of cars for travel to work/training showed nearly no differentiation between people living in single-family homes (52%) and multi-storey buildings (45%). The use of public transport was higher for people in townhouses (47%) and multi-storey buildings (43%), but lower for people living in single-family homes and in buildings with more than six storeys (32%).

With respect to shopping for daily needs, people in the Suburban (51%), Urban (46%), and Ecological (43%) clusters were more likely to use cars, whereas those in the Neighbourhood-oriented cluster reported walking (47%) more often than driving (33%). Use of public transport was very evenly distributed among the lifestyle clusters, with shares ranging from 13% to 17%. For housing forms, almost 60% of the residents of single-family homes reported using cars for these types of trips, and this share declined with building density (it was the lowest for people living in multi-storey buildings with more than six storeys: 36%). The share of walking showed a converse pattern. The share of public

transport use was only slightly higher in among people living in multi-storey buildings (15%), and it was lowest among those in buildings with more than six storeys (9%).

Conclusions

The Viennese district of Liesing is on the urban fringe, and its transport infrastructure is oriented towards the city centre. The major public transport and road networks are oriented from South to North, to connect the outlying areas and the centre. The southern metro Vienna region is strongly linked with Liesing, both in functional and morphological terms. Large volumes of daily commuter traffic flow from the south of the metro region Vienna into the city. Of the southern Vienna suburbs, Liesing has the largest volume of transit traffic heading to the city. In addition, the population of Liesing is the most highly motorized in Vienna (about 500 cars per 1000 inhabitants, compared with 390 in the city, i.e. the administrative boundaries of the City of Vienna), and the inhabitants make more trips by individual transport than do the people in the city. This leads to high loads on the road network and congestion.

To test the hypothesis that lifestyle influences mobility patterns for leisure activities in Liesing, we identified social groups or lifestyle types based on orientations and attitudes towards the transport and leisure infrastructure, as well as the frequency with which people use the leisure infrastructures. Thus, we operationalized lifestyle as a construct that is largely characterized by free time activities and orientations but also by general views on the transport infrastructure. This study showed that depending upon the trip purpose (daily trip or leisure trip) and the related destination and accessibility constraints, either location factors or lifestyle emerge as the deciding factors for choice of transportation mode. Trips to work and training are restricted to a certain destination, which limits choices. For these trips, location, accessibility and travel time have more influence on travel mode choice than do lifestyle or mobility orientation.

The modal split for leisure trips better represents the multimodal mobility orientations found among the respondents. The share of trips made by car was lower than for daily trips, and other travel modes were well represented. This confirms the hypothesis that people are freer to decide where to go and which transport mode to use for leisure activity trips. For leisure trips to destinations that are predominantly a greater distance from the residence (sports facilities, arts and culture, and culinary art), the correlation of lifestyle with mode choice becomes more important and overlays and stratifies the influence of locational factors. This was evident in the clear patterns in travel mode choice for lifestyle groups and housing types, with people in the Suburban cluster and residents of single-family homes traditionally having the highest shares of car use, people in the Urban and Neighbourhood-oriented clusters and residents of multi-storey buildings having the highest shares of public transport use, and people in the Ecological cluster and residents of multi-storey buildings having the highest shares of walking.

Regarding leisure trips, the modal split in all of the leisure activity groups was significantly correlated with the location of the infrastructures to which people were travelling. For these respondents, frequently used public and private green spaces had short travel distances, and they elicited the highest share of sustainable transport (mostly walking). The other leisure destinations were less frequented, and they had longer travel distances and a greater share of car and public transport. The share of public transport was greater for trips to leisure activities that are located in other districts of Vienna or in the centre (arts and culture, culinary art and shopping), which are better accessible by public transport and generally have restrictions regarding car traffic (mostly parking restrictions and traffic congestion). The influence of lifestyle, mobility orientation and housing form on travel mode choice is subordinate to locational factors for trips to leisure destinations that are usually very close to home and accessible by foot. The provision of attractive public and private green spaces in close proximity to housing areas has proven to be very effective in Liesing, as it keeps citizens in their neighbourhood, decreases travel distances for leisure trips and promotes walking.

This study shows that lifestyle, decisions about place of residence and the urban environment often are mutually dependent. In Liesing, the choice to live in an environment with lower settlement density, remote from the city centre and close to green spaces, represents a certain lifestyle. People who choose this lifestyle consciously accept constraints related to accessibility, public infrastructure and choice among transport modes because other values are more important. However, the results of the analysis show that even representatives of this particular lifestyle are not a priori car oriented, and they do not necessarily want long-distance trips. The mobility orientations of residents in Liesing indicate that the desire for individual car mobility is weaker than the large travel mode split and motorization of the district population would suggest, which in turn suggests that there is potential for a shift to sustainable transport modes, provided that infrastructure for public transport, walking and cycling is improved.

A shift away from car use seems to be easier to manage for leisure trips than for trips to work and training, where the freedom of choice regarding destinations is restricted. Trips to work and training are often towards the city centre, and naturally, people living in remote districts such as Liesing are disadvantaged in terms of accessibility and the distances that they have to cover. This disadvantage cannot be completely eradicated, but a shift away from car use can be encouraged by planning measures that provide incentives for other modes of transport (e.g., better local feeder connections to major public transport lines) and disincentives for car use (e.g., parking restrictions or speed limits). Improving accessibility through public transport or bicycling within the district, and providing better connections between local centres and the main transport corridors, are important prerequisites for changing mobility patterns in Liesing.

3. Urban development, planning and transportation

3.1. Long-term interactions between transport infrastructure and land use[44]

It is widely understood and accepted that land use and transport infrastructure interact over time. On the one hand, improvements in transport infrastructure increase accessibility to locations and make the land more attractive for development. On the other hand, land development increases the demand for transport and infrastructure improvement. What is less well understood are the ways in which transport infrastructure and land use interact over time. Many theories (such as the bid rent theory and the central place theory) as well as qualitative explanations have attempted to answer this question in different ways. However, empirical findings are surprisingly scarce. To address this knowledge gap, this research reviewed the existing literature for long-term empirical evidence of land use and transport infrastructure interactions. We focused on passenger transport infrastructures; namely, road networks and public transit. All of the studies that we reviewed investigated physical changes in infrastructure, such as the addition of highways or transit stations and lines, in relation to changes in land use; specifically, changes in land cover (e.g., conversion from non-built-up to built-up land), population density and development density (i.e., employment, residential and commercial densities).

Research questions and methods

The studies that we reviewed can be grouped under three main headings: scope, research methods and results. These headings are directly related to three central research questions. First, which direction of the long-term land use and transport infrastructure relationship has been investigated in the existing empirical literature (the effect of transport infrastructure on land use, vice versa or both)? Second, which research methods have been used to investigate the long-term interactions of land use and transport infrastructure? Third, what are the existing empirical findings, and to what extent are these consistent with each other?

This is a review of recent empirical studies from different parts of the world that have considered the long-term impacts of transport infrastructure networks (TIN), both road and rail infrastructure, on land use (LU). All of the studies that we reviewed were published in peer-reviewed journals between 1995 and 2014. Articles were identified by using combinations of the following keywords in SCOPUS and Google Scholar: i) land use, urban form, the built environment; ii) transport (infrastructure), (rapid) transit, road network, highway; and iii) impact, interaction, relation, change. Using a snowball method, we identified 49 studies for review in different periods and covering various time spans.

Main results

Proximity to rail is generally considered to have influenced population distribution, especially after the emergence of railway networks. Exceptional negative effects have been reported for lagging regions, trunk lines that were not beneficial to the local study area, or areas that already had dense rail service for a while. Proximity to rail has also promoted conversion of land to residential land use and the development of higher residential densities. However, findings on the role of rail proximity in increasing employment density are inconclusive, indicating that its impacts are more dependent on exogenous factors, such as complementary policies and area attractiveness, which are mostly favourable in downtown areas.

For road networks, studies generally suggest that the presence of (or proximity to) major highways is associated with the conversion of land to urban land use, increases in employment densities and commercial and industrial development. However, the presence of road networks does not always stimulate residential land

44 Responsible partner: OTB Research for the Built Environment, Delft University of Technology.

use, suggesting that living in the direct vicinity of motorways could be unattractive.

Of the 19 studies that examined access to rail and road networks, almost all of them found lower coefficients or no significance for access to rail lines compared with road networks, regardless of the study period. However, it should be noted that these studies mostly focused on changes during the second half of the 20th century and onwards, when rail networks can be assumed to have lost their initial impact.

Exogenous factors influencing the supply of TINs and LU can determine the impacts of TINs on LU. Technological innovations, infrastructure investments and mobility policies influence the supply of TINs. Several factors play important roles in land use, including regional demand, land availability, area attractiveness and spatial policies. Although these factors have been mentioned in the studies, they have not always been explicitly addressed. This is especially true for attractiveness and spatial/transport policies.

Conclusions

First, there seem to be more reports of insignificant land use/transport infrastructure interactions in studies covering more recent periods. This may be because the impact of transport infrastructure on land use is likely to diminish over time as transport-based increases in accessibility reach saturation. For instance, the impact of streetcars on land use at the turn of the 20th century was likely to have been stronger than that of highway improvements at the end of the same century.

Second, the results of studies on land use and transport interactions can differ depending upon the intervals investigated in the study period. For instance, highway improvements may show different impacts on population growth depending upon whether such impacts are measured at 10-, 20- or 30-year intervals. Furthermore, the rate of change may differ across intervals. Ideally, studies should distinguish between the short-, medium- and long-term effects of land use/transport interactions and should measure the rate of change at various intervals. Such information would help policymakers to understand which consequences of land use or transport infrastructure can be expected within which time spans, which would help them to determine which supportive measures should be taken during a given period.

Third, the studies indicated that spatial scale (study area) also plays a role in the land use/transport relationship. In general, studies that examined impacts at larger scales (such as the national level) seemed to suggest more significant relationships. This observation can be attributed to what is known as the scale effect: There could be a mismatch between the level at which a phenomenon is studied and the existence of impacts, the type of impacts (positive or negative) and their significance at other scales. For example, while the opening of new railway stations can increase population at a local scale, it might lead to population decentralization or suburbanization at the metropolitan level (as was the case with railway-led suburbanization in many countries at the turn of the 20th century). This is closely related to the phenomenon of spillover effects, which was only addressed in a few of the studies that we reviewed and that should be a focus for further research.

Fourth, the type of indicators used can influence the results. We believe that the choice of indicator for transport infrastructure change is more likely to influence the results than is the choice of land use indicators, because the former are more varied than the latter. Some researchers use very simple indicators (such as the presence or absence of rail access), whereas other researchers believe that it is very important to capture the change in transport-related accessibility in a detailed manner. Gravity-based indicators appear to capture more significant transportation/land use relationships than do indicators that only measure the existence of transport infrastructure in a spatial unit of analysis.

Fifth, most of the studies investigated relationships between road networks and land use changes. Fewer studies examined both road networks and public transit, especially public transit networks. We need further knowledge about the impacts of public transit on land use and vice versa. This information would further our understanding of the feasibility of public transit studies and the potential success of planning concepts such as transit-oriented development (TOD) and smart growth. Furthermore, investigations of the role of bus networks can be especially helpful for understanding the transition from rail to car use, and the complementarity or competition between bus and rail transportation in relation to land use change.

Sixth, although many studies have modelled population density in general, and residential, employment and commercial densities in particular, only a few studies have measured long-term changes in land cover as a result of transport infrastructure development. Furthermore, our knowledge of the impacts of public transit developments on land cover is rather limited, as most studies focus on the role of highways and road networks. To the best of our knowledge, there are no studies that measure the impact of land cover changes on transport development, which should be the focus of further research.

Finally, we consider the role of planning and (local) policy. Undoubtedly, differences in policy cultures have played an important role in land use/transport interactions, but many of the studies that we reviewed did not investigate this potentially influential factor. This is probably because it is extremely difficult to disentangle policy influences from free market forces, at least with the methods used in the existing literature.

3.2. A deconstruction of the concept of transit-oriented development[45]

The concept of transit-oriented development, or TOD, has generated much interest in Europe over the last decade because of a combination of factors, including technological innovations in transit, privatization reforms in rail transit, new goals of sustainable urban development, and the shifting spatial dynamics of contemporary society. Some of the pioneering work that defined and codified TOD was presented in 1993 in The Next American Metropolis, by Peter Calthorpe, in which he proposed a series of conceptual design schemes and diagrams that have come to epitomize TOD. Because the term 'TOD' originated in the United States, this model is often assumed to be a recent import from North American cities. However, it is based on much older ideas of rail-based urban development that took place in many European cities during the 19th and 20th centuries.

Research question and methods

This study examines how planning policies in three European capital city-regions – Amsterdam, Stockholm and Vienna – have been shaped by the ideas and principles that underlie TOD. All of these case studies are located in countries with mature spatial planning systems: the Netherlands (Western Europe), Sweden (Northern Europe) and Austria (Central Europe). To be clear, we do not analyse direct references to TOD in the planning policies of these city-regions. Instead, we examine the extent to which planning policies from the middle of the 20th century to the present have reflected TOD principles. The main focus of this analysis is on train-based (i.e., 'nodal') TOD, as opposed to tram-based or 'corridor' TOD. Much of the analysis is based on secondary sources (articles, books and planning reports) written in English.

We discuss the history of TOD using the 'culturized planning model' as an analytical lens to explain the evolution of planning policies and processes. As the name suggests, this model concerns planning culture, and it builds on earlier paradigms, including path dependence, path shaping, globalization, Europeanization, policy diffusion and families of nations. The framework considers both manifest and latent aspects of culture, and the underlying assumption is that 'planning culture' encompasses collective thinking modes and behavioural patterns that stem from shared professional codes as well as from more general societal values. The culturized planning model consists of three analytical levels: (a) planning artefacts; (b) the planning environment; and (c) the societal environment. Clearly, these are not discrete levels; there are interactions within and between levels.

Main results

The analysis indicates that TOD, albeit called by other names or not named at all in the policies that we examined, has been an intrinsic principle of planning since WWII in Austria, the Netherlands and Sweden, and in their respective capitals. Far from being a recent North American invention, TOD has its roots in Europe and dates back many decades. Clearly, the enthusiasm with which the recent embodiment of TOD has been received in the USA and Canada has done much to highlight and promote the concept in Europe in recent decades. This study indicates that the extent to which the TOD concept finds resonance in Europe is closely related to the prevailing societal and planning environments.

In the early post-war period, new satellite towns or lobes were developed around the peripheral stations of the train and metro systems of Vienna, Amsterdam and Stockholm. This period reflected the economic prosperity and popular desire to suburbanize in that era. In later years, in parallel with the urban revival movement, TOD efforts were focused on the inner cities, in new brownfield redevelopments. In both cases (earlier suburban and later urban TODs), the national, regional, and local governments played a major role in steering development (a planning artefact) towards public transit stations and lines, and in providing public transport to existing housing developments. The TOD phenomenon (a marriage of transit and land use) did not occur naturally.

Conclusions

Planning in Austria, the Netherlands and Sweden can be considered as being in a state of flux. The discourses contained in policy documents show support for sustainable and resilient urban and regional development,

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and they include TOD in a major way. At the same time, changing political priorities and administrative reform (affecting the planning environment) have led to a gradual decline of the planning profession's status. The recent economic crisis has favoured deregulation and market-led economic development. Planning is increasingly framed as a time-consuming and cost-intensive activity. The concept of space as a regulated public domain has weakened. Spatial planning has especially lost ground at the national and regional levels. Economic growth has priority at the moment. As a result, the interests of developers are generally placed ahead of strategic efforts to structure cities and regions in a more environmentally sustainable manner. Given that planning has a long tradition in all three of these countries, many commentators regard this reorientation as a dramatic step backwards.

3.3. Transit-oriented development and travel patterns: empirical investigations[46]

It has been argued that improvements in the supply of transport infrastructure networks affect accessibility, which in turn influences the distribution of land uses, activities linked to them and, eventually, the travel behaviour of individuals. Identifying the extent and rate of change in travel behaviour as a response to change in spatial and socio-demographic characteristics requires long-term empirical investigations of their relationships. Such empirical findings are crucial to assessing the impact of previous investments in transport infrastructure and former applied land use policies. In addition, they can provide guidelines for the type, extent and location of future investments. However, studies that quantify long-term developments at a regional scale are very scarce. This study explores trends in access to transport infrastructure (proximity to the railway stations), land use (location of inhabitants), socio-demographic characteristics of the travellers and travel behaviour (distance travelled by car, train and active modes and the total number of trips per day) over three decades in the Dutch Randstad.

Research question and methods

The aim of this study is to shed light on trends in land use and socio-demographic characteristics that are linked to travel behaviour over time and across various regions of the Randstad (the population and economic core of the Netherlands, situated in the west of the country). The main research question is: how have access to transport infrastructure, land use, individual socio-demographic characteristics and travel behaviour evolved in relation to each other in the Dutch Randstad from 1980 to 2010?

We constructed a long-term, geo-referenced database from various sources, and we made spatial, socio-demographic and travel behaviour data consistent for seven time points at five-year intervals: 1980, 1985, 1990, 1995, 2000, 2005 and 2010. The spatial unit of analysis was the municipal borders for 2004, and previous and subsequent spatial and travel behaviour data were converted to these boundaries. We analysed the development of spatial, socio-demographic and travel behaviour data separately and in relation to each other with descriptive statistics.

Travel behaviour variables: We extracted travel behaviour variables from the Dutch National Travel Survey (NTS), which provides reliable annual travel diary data back to 1979. The sample was limited to the Randstad (See Figure 1). In some cases, previous and subsequent respondents were added to the respondents for a given year (e.g., 1984 and 1986 were added to 1985) to increase the sample size for that year and to make it comparable with the sample sizes at other time points. The respondents were further filtered by their age (those younger than 20 years of age were excluded because of their limited mobility) and whether they had reported at least one trip during the survey day. The final eligible numbers of respondents by year were: 13,521 for 1980, 15,328 for 1985, 16,777 for 1990, 35,738 for 1995, 32,747 for 2000, 36,749 for 2005 and 14,368 for 2010.

The travel behaviour indicators that we examined were total kilometres travelled per survey day by i) train, ii) car (passenger/driver), iii) active modes (walking and cycling), and by all the above. We also examined the total number of trips by the above modes per survey day. For multimodal trips, the transport mode that was used for the longest leg of the trip was regarded as the main mode of travel. Trips and kilometres travelled by modes other than the above (e.g., motorcycles, tram, bus, metro) were excluded from this analysis.

Socio-demographic variables: The socio-demographic variables were the respondents' age, gender, level of education, income and household car ownership.

Land use and access to transport infrastructure variables: We categorized the respondents' residential municipalities according to The Randstad's 'daily urban systems', a concept first introduced by Van der

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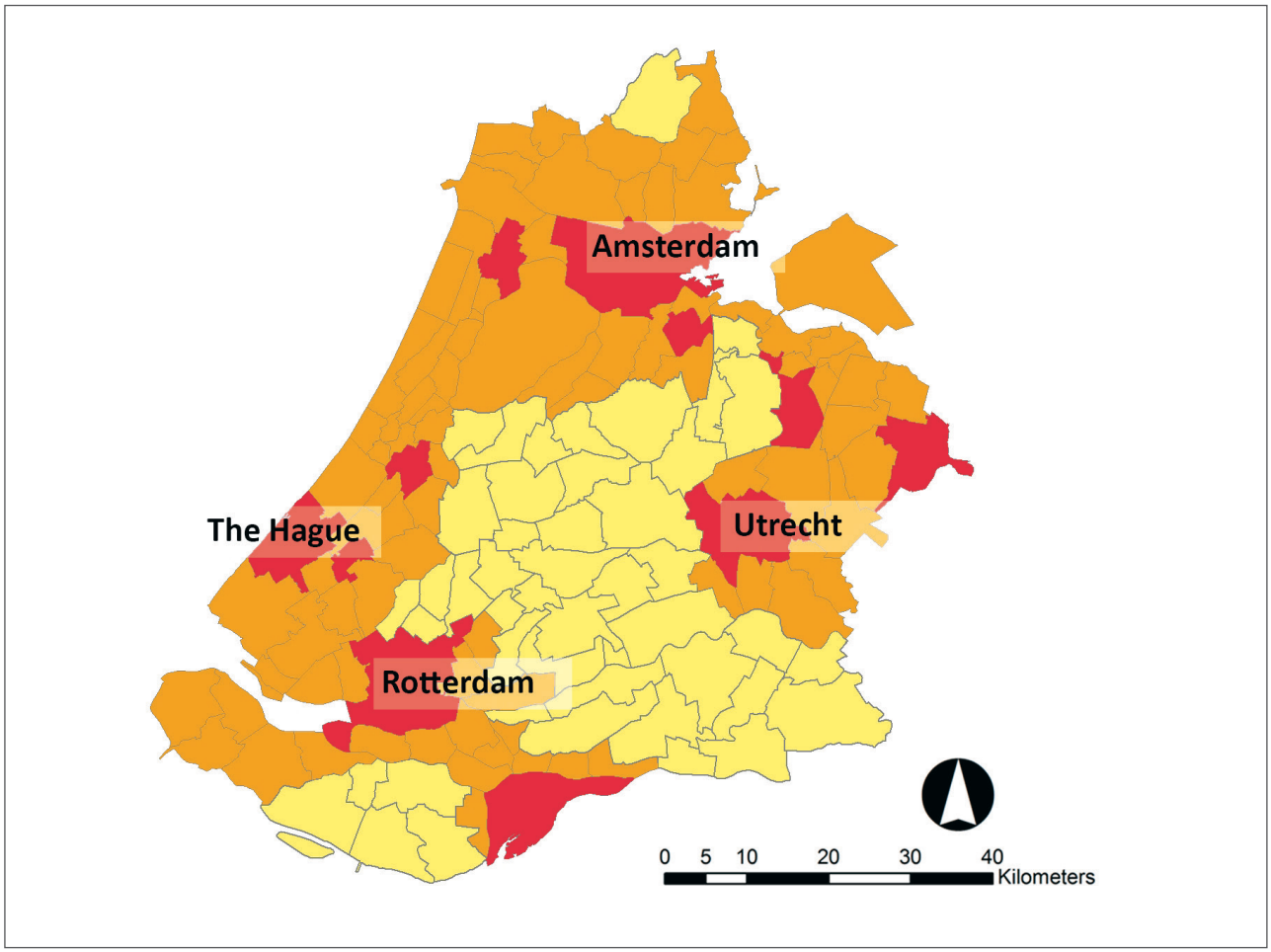
Figure 3 *Classification of 'urban centres' in the Randstad*



Classification of 'urban centres' (red), 'suburbs' (orange) and 'other, (yellow) in the Randstad based on daily urban systems

Laan in 1998[47] (Figure 3). Although The Randstad and its borders have evolved, its daily urban systems have been relatively stable over time. The three categories of daily urban systems are 'urban centres' (Amsterdam, Haarlem, the Hague, Rotterdam, Dordrecht, Utrecht, Amersfoort and Hilversum), 'suburbs' (medium-sized cities in the vicinity of the urban centres) and 'other', including the Green Heart (a preserved and mainly rural area at the centre of The Randstad) and municipalities situated in the outer Randstad ring. We measured the distance from rail service as the Euclidian distance from the municipality's mean centre (regarding the dispersion of built-up area across the municipality) to the closest rail station.

Main results

Trends in travel behaviour

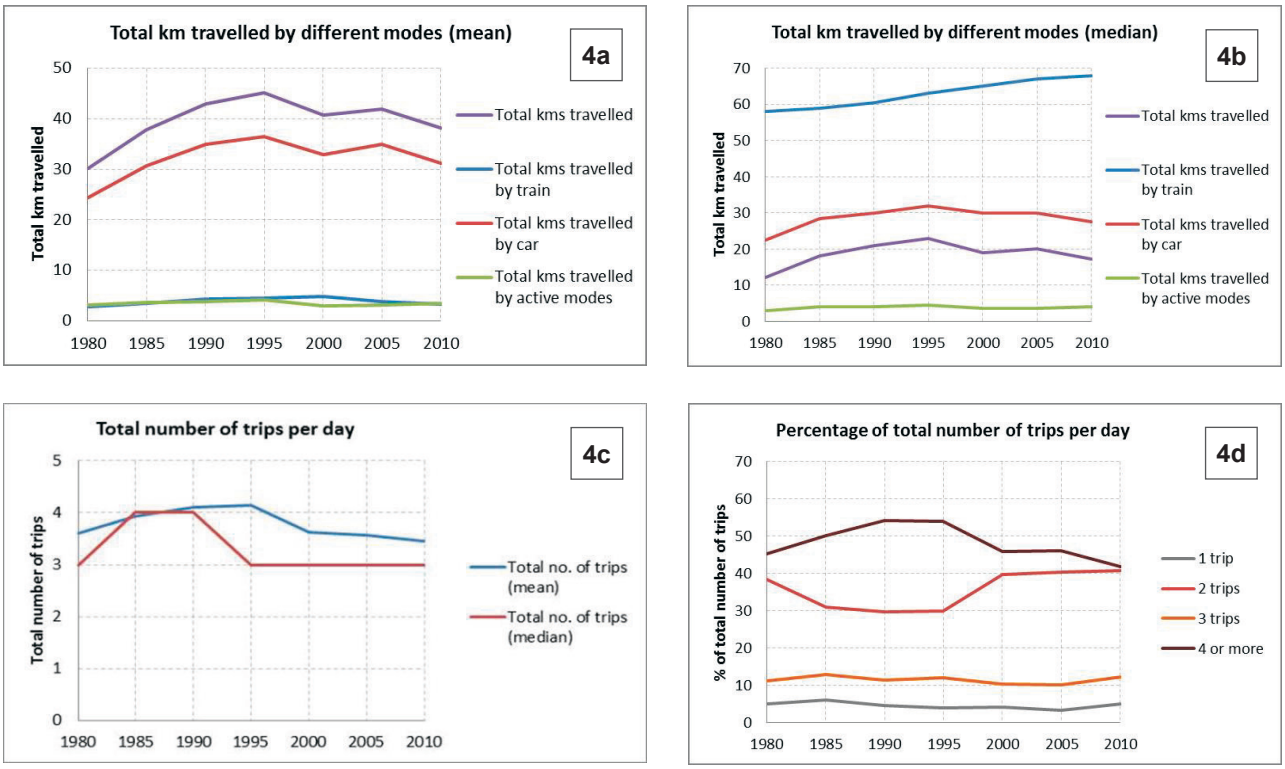
Figures 4a–d summarize long-term trends in the respondents' total kilometres travelled (tkt) across all modes of transport and for each transport mode (average and median), and the total number of trips per survey day from 1980 to 2010.

Figure 4a shows that the average total kilometres travelled by car were significantly higher than those by train and active modes. The total kilometres travelled by car almost mirrors the total kilometres travelled overall (as the kilometres travelled by car account for most of the total kilometres travelled). The tkt increased from 1980 and peaked in 1995; it has been decreasing ever since. However, there are two caveats. First, the mean (average) can be greatly influenced by outliers (e.g., a limited number of people who travel very long distances by car). Second, car trips overwhelmingly dominate the sample (at each time point, only about 4% of the total trips in the sample were made by train).

If we look at the trips taken with each transport mode, we see that the median train kilometres travelled was significantly higher than the median car kilometres travelled (Figure 4b). Moreover, this median rose by 10 kilometres over the study period, contrary to

47 van der Laan, L. (1998). Changing urban systems: an empirical analysis at two spatial levels, *Regional Studies,* 32(3), 235–247.

Figure 4 a-d *Trends in modes of transport in The Randstad, 1980–2010*



Trends in mean/median total kilometres travelled across all modes of transport and for each transport mode, and mean/median total number of trips per day in The Randstad, 1980–2010

the median total car kilometres travelled. This means that trains are increasingly being used for travelling longer distances.

Over the years, the median total number of trips per day has stayed mostly the same; i.e., three trips per day (Figure 4c). However, the share of two trips per day has risen at the expense of four or more trips per day since 1995 (Figure 4d). Overall, we can conclude that although the total number of kilometres travelled has changed over time, the frequency of trips per day has remained stable.

Trends in travel behaviour in relation to socio-demographic and land use variables

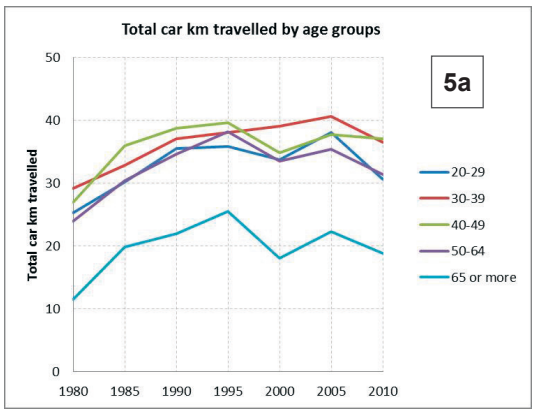
Figure 5a–h compares the relationship between a number of socio-demographic and land use variables and total kilometres travelled by car versus train. As expected, total kilometres travelled (across all modes and for each mode) generally decreases as age increases. However, people in their 30s (followed by those in their 40s) reported the highest car kilometres travelled, whereas people in their 20s (followed by pensioners until 1995) had travelled the most kilometres by train.

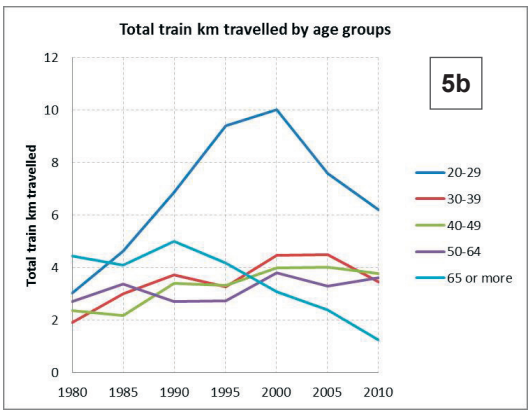
Men travelled longer distances by car than women (Figure 5c), and although they also reported more total train kilometres travelled, this latter difference was significantly smaller (Figure 5d).

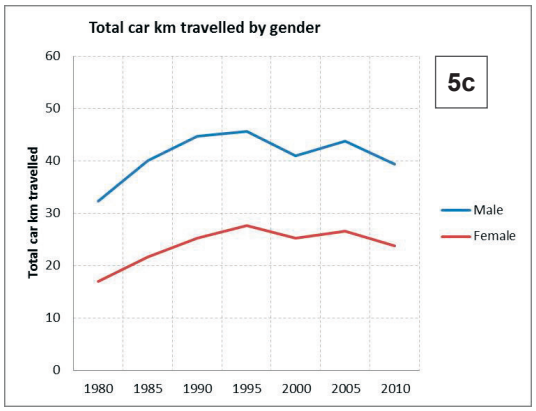
As Figure 5e–f demonstrates, location was linked to the amount of kilometres travelled. As respondents' home municipalities moved from the central urban cores to suburban and other (outer ring and the Greet Heart) municipalities, the total kilometres travelled by car rose, but the total kilometres travelled by train decreased. The difference between central and other municipalities was more significant, especially for total kilometres travelled by train. This is likely because municipalities in the urban cores benefit from better access to railway infrastructure supplies and services.

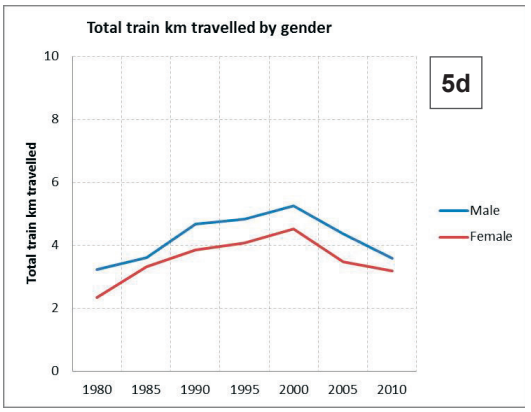
Figure 5g–h demonstrates the relationship between the distance to the closest railway station and the total car and train kilometres travelled. Based on the distance travelled at five-minute intervals, at 3 km/hr and 15 km/hr for walking and cycling, respectively, we set radius thresholds of 500 m, 1250 m, 2500 m and 3750 m. Total train kilometres travelled was highest within the 500–1250 m radius buffer from the train station. Beyond 1250 m, a distance decay trend was observed. Contrary to expectation, living in the 0–500 m radius was not related to the highest train kilometres travelled. The proximity to rail stations and total car kilometres travelled seem to be unrelated.

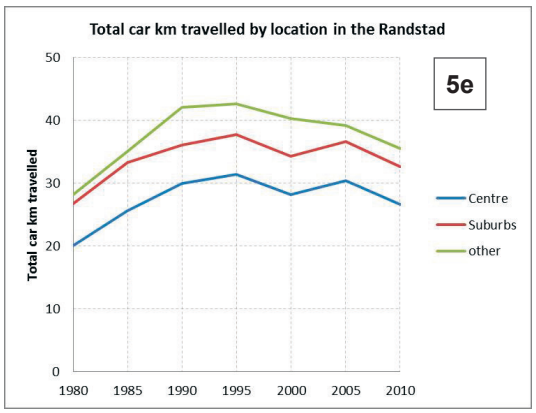
Figure 5 *a-h Trends in car and train travel in The Randstad, 1980–2010*

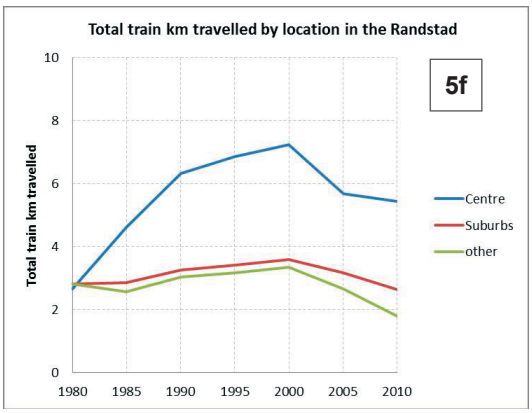


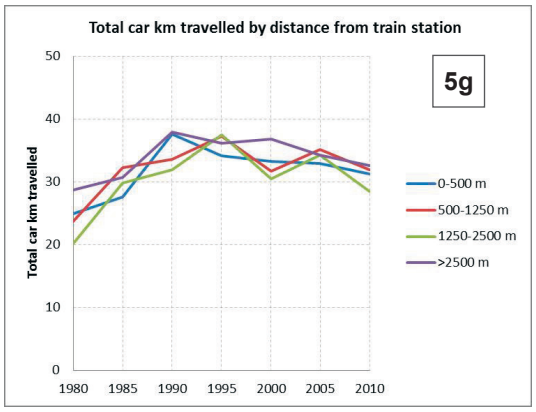


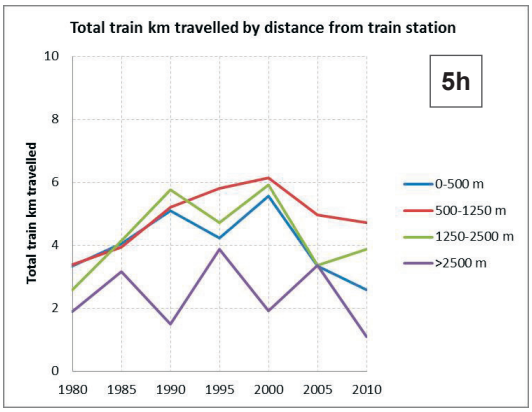












Trends in total car and train kilometres travelled by age, gender, location in The Randstad and distance from train station in The Randstad, 1980–2010

Table 1 *Relationships between socio-demography factors, location and travel behaviour*

	Total km travelled by all modes	Total km travelled by train	Total km travelled by car	Total km travelled by active modes	Total no. of trips per day
Age	—	—*	—*	*	—*
Gender (from male to female)	—	—	—	+	+
Education	+	+	+	*	+
Income	+	+	+	—	*
Household car ownership	+	—	+	—	*
Location (from centres to outer rings)	+	—	+	—	—*

Summary of relationships between socio-demographic factors, location and travel behaviour indicators .Notes: — = negatively related; + = positively related; +/—= overall positively/negatively related; however, there are exceptions regarding some subcategories; *= varying relationship.*

Conclusions

A summary of the relationships between a selection of socio-demographic factors, land use and different indicators of travel behaviour is presented in Table 1. Although most of these relationships remained stable over the study period, there were a number of exceptions, some of which were discussed in the previous section.

The findings of this study corroborate prior research in the field: where people live (which is related to the 5 Ds of Density, Diversity, Design, Destination accessibility and Distance to transit) is significantly related to their travel mode choices and kilometres travelled.48 This study also provides some evidence for the hypothesis that a paradigm shift could be emerging in which total passenger kilometres in motorized modes has slowed its acceleration in industrialized countries.[49]

Moreover, the results indicate that trains are increasingly being used to travel longer distances. Thus, further investment in transport policies that facilitate the use of long-haul commuter trains, especially high-speed railways, could benefit from, and reinforce, this trend. Interestingly, the median total kilometres travelled per day in The Randstad remained under 30 kilometres, even at its highest point in 1995. In other words, half of the inhabitants of The Randstad have travelled no more than 30 kilometres a day for the last 30 years. This makes relatively limited range alternative transport modes, such as electric cars and bikes, suitable for the Dutch context and especially for The Randstad.

Living within 500–1250 m of a train station was associated with the most train kilometres travelled. Detailed investigation into the extent to which thresholds for train station proximity affect the travel behaviour of inhabitants is needed. The findings reported here may have implications for designating train stations' impact areas in transit-oriented development plans.

Finally, future research should incorporate multivariate analysis to measure the specific share of various factors in explaining travel behaviour, as well as the changing influence of such factors over time. Various land use and transport accessibility indicators need to be tested to see which are suitable for capturing changes in the transport network and land use development over time. A promising approach to measuring the long-term influence of spatial and socio-demographic factors in travel behaviour is the use of pseudo panel analysis. This emerging method applies panel analysis to repeated cross-sectional data (such as the Dutch National Travel Survey, NTS) and manages to benefit from disaggregated data while dealing with the limits of repeated cross-sectional data.

48 Ewing, R. & Cervero, R. (2010). Travel and the built environment. *Journal of the American Planning Association*, 76(3), 265–294.

49 Millard-Ball, A. & Schipper, L. (2011). Are we reaching peak travel? Trends in passenger transport in eight industrialized countries. *Transport Reviews*, 31(3), 357–378.

4. Urban living labs

4.1. A new mode of soft and innovative urban governance?[50]

In the current era, in which cities are considered to be key arenas for coping with a number of societal challenges, there is renewed interest in experimental practices in urban planning. A growing interest in innovative initiatives that emphasize co-creation, exploration, experimentation and evaluation, such as urban living labs, must be understood in relation to the uncertainty regarding the modern growth paradigm and its institutional arrangements: 'the pragmatist heritage of urban laboratories gains renewed strength in the current era in which the belief in modernity, progress and development is in crisis'.[51] This study provides a sympathetic critique of urban living labs and related experimental practices from an urban planning and governance perspective.

Research questions and methods

- What are the main characteristics, principles and dynamics of urban living labs?
- How can we relate urban living labs to other approaches and concepts in planning research (such as communicative planning and actor-relational approaches)?
- What is the potential for, as well as the shortcomings of, urban living labs as temporary modes of soft governance?

We conducted a literature review on (urban) living labs and related concepts for this project, and their relationships to contemporary debates in planning theory. Our goal was to provide the underlying analytical framework for the empirical investigations undertaken in Stockholm and Vienna (see below, sections 4.2 and 4.3.)

Main results

Research on (urban) living labs has (so far) mainly focused on the tools, methods, processes and assessments of technical and social innovations rather than critically investigating the quality of governance of (urban) living labs and how they inform, or are engaged with, policies and politics.[52] Here, we are especially interested in how urban living labs can be understood as informal 'soft modes of temporary governance' and how to position them in the framework of various activities that try to complement formal planning practices, which themselves are often labelled as new forms of urban governance. In this process, we have distilled a few core principles of urban living labs (co-creation, exploration, experimentation and evaluation; see below), and we will discuss their usefulness as a theoretical frame for understanding these informal self-organizing initiatives in the light of contemporary urban planning theories and practices. We also consider how the notion of urban living lab could be further developed through critical engagements with communicative planning theory and an explicit focus on actor-relations.

What are urban living labs?

Urban living labs are supposed to offer both a methodology and an environment for social as well as technical innovations. Through public–private partnerships, the intention is to overcome institutional lock-ins and to utilize multidisciplinary collaboration. The idea is to mobilize individual stakeholders as experts of their experiences and to enable them to advance from participants to co-creators of knowledge. In doing so, these urban laboratories are expected to provide strategies of experimentation within prescribed boundaries. Today,

50 Responsible partner: Nordregio.

51 Karvonen, A. & van Heur, B. (2014). Urban laboratories: experiments in reworking cities. *International Journal of Urban and Regional Research*, 38(2), 379–392.

52 cf. Veeckmann, C.; Schuurman, D.; Leminen, S., & Westerlund, M. (2013). Linking living lab characteristics and their outcomes: towards a conceptual framework. *Technology Innovation Management Review,* 3, Issue December, 6–15.; Juujärvi, S. & Pesso, K. (2013). Actor roles in an urban living lab: what can we learn from Suurpelto, Finland? *Technology Innovation Management Review.* 3, Issue November, 22–27; Bergvall-Kåreborn, B. & Ståhlbrost, A. (2009). Living lab: an open and citizen-centric approach for innovation. *International Journal of Innovation and Regional Development,* 1(4), 356–370.

at least three types of urban living labs can be identified.[53] In the first type, urban areas can serve as 'technology-assisted research environments' in which users provide feedback about services or products through digital platforms or sensor-based methods. These urban living labs may aim to improve an urban environment or service, such as public transportation, waste management or housing. The co-creation of local spaces, services and/or objects, including underused or abandoned buildings, day-care services or public spaces, is a second type of lab. The third type of urban living lab can also lead to new or enhanced forms of urban planning that use new tools or processes. Here, facilitating local vision-making and planning procedures and/or greater opportunities for stakeholders to meet and learn from one another are the central objectives. In doing so, the lab can serve as a platform for stakeholders to take part in planning initiatives and decision-making processes. However, urban living labs should not be conflated with traditional planning projects, as they do not necessarily result in a plan or development project.

Co-creation

Non-technically oriented urban living labs evolved from the notion of co-developing cities, with a view that defined spaces of the city can be sites for open experimentation. Given the emphasis on socio-spatial co-development, approaches for these labs tend to include terms such as 'co-creation', 'empowerment' and 'participation', and they offer inclusive, participatory and do-it-yourself settings that engage citizens and local actors in the processes of shaping the city.[54] In an era of declining civic involvement, societal fragmentation and demands for greater institutional flexibility, urban living labs seem to be a tool that can foster social, political and economic innovation, development and co-operation in cities. Offering a new forum for interactions among a diversity of actors, or, in a sense, a new mode of (urban) governance, urban living labs can be used to establish a defined space for experimentation where users can become 'co-creators of values, ideas and innovative concepts'.[55] However, we need to add critically that urban living labs offer a structure for enlarging the scope of associative as well as participative democracy, in parallel with other urban planning activities in a city that are related to formalized participative procedures of representative democracy. In other words, urban living labs constitute a specific club, and the rules of inclusion and exclusion must be critically questioned.

Exploration and experimentation

Emphasizing the exploratory nature of the approach can help to familiarize urban living lab actors with the notion that urban development processes can be undertaken without a predefined aim. Such an emphasis can encourage participation, engagement and co-creation in several ways. First, it reduces the likelihood that any one actor will be able to claim jurisdiction or to achieve an overt dominance over the content of an urban living lab during the process, as it is difficult to achieve such a position when the process does not have a clearly defined aim or outcome. The experimental nature of urban living labs also encourages open discussions, fostering the idea that 'there are no stupid questions, only stupid answers'. This may enable actors who may not otherwise feel confident enough to express their views or to challenge those of a traditionally dominant actor to voice their opinions. Furthermore, the overtly exploratory nature of urban living labs helps to familiarize actors with uncertainty, and the notion of using urban living labs to test ideas can encourage more creative or provocative initiatives without the fear of long-term negative consequences should an idea fail to deploy as expected. 'One of the key strategies of uncertainty reduction is the labelling of particular sites as urban laboratories.'[56] Pursuing this approach, ideas can be proposed, tested and evaluated without significant long-term commitment. However, should an idea prove to be successful, it can subsequently be scaled up or applied more broadly.[57]

It is important to note that there is considerable variation among urban living labs regarding how the concepts of 'laboratory' and 'experiment' are employed. In some cases, urban living labs may use these notions as a way to establish and reinforce dominant patterns of urban development further. Other urban living labs adopt more progressive and open approaches in which

53 Juujärvi, S. & Pesso, K. (2013). Actor roles in an urban living lab: what can we learn from Suurpelto, Finland? *Technology Innovation Management Review*, 3, Issue November, 22–27.

54 Franz, Y. (2014). Chances and challenges for social urban living labs in urban research. In *Conference Proceedings of Open Living Lab Days* 2014, Brussels: European Network of Living Labs (ENoLL), 105–114.

55 Hakkarainen, L. & Hyysalo, S. (2013). How do we keep the living laboratory alive? Learning and conflicts in living lab collaboration. *Technology Innovation Management Review,* 3, Issue December, 16–22.

56 Karvonen, A. & van Heur, B. (2014). Urban laboratories: experiments in reworking cities. *International Journal of Urban and Regional Research,* 38(2), 379–392.

57 JPI URBAN EUROPE (2015). *Transition Towards Sustainable and Liveable Urban Futures: the Strategic Research and Innovation Agenda SRIA*.

co-operative and communicative initiatives are undertaken to foster change, with a recognition of the transformative potentials (and inherent complexity) of contemporary urban issues. Thus, we must carefully question the way in which the laboratory notion is applied, as it might imply a regulated and controlled 'environment for experimentation' rather than an 'openness' and opportunity for 'dealing with complexity'. Such discrepancies between labs can be problematic, as there is the risk that the urban living lab concept will become so broad and ubiquitous that it loses meaning.

Evaluation

The diversity of settings, scales and approaches associated with urban living labs can make evaluations challenging. The flexibility to select methods and tools tailored to the aims and approaches of a particular urban living lab can increase the contextual place-based relevance of the urban living lab concept, but it could limit the capacity to compare, contrast and consolidate findings from a diversity of urban living labs. These issues could limit the potential of urban living lab development. Furthermore, with the emphasis on processes, co-creation, experimentation and exploration, the impacts (and evaluations) of urban living labs are not straightforward, as they are not similar to more result-oriented initiatives. More specifically, impacts are seen in incremental changes throughout the project rather than in a single end product or outcome. Although the issues outlined above are problematic, they do not have to be insurmountable. In seeking to distil the breadth of urban living lab approaches into a measurable and comparable concept, Karvonen and van Heur focus on the experimental nature of the labs: 'We argue that the emphasis on experimentation leads to three achievements of urban laboratories: situatedness, change-orientation and contingency.'[58] They continue by arguing that these three urban living lab aspects can serve as 'normative benchmarks' through which initiatives and practices that claim the urban living lab banner can be evaluated and critiqued. This evaluative approach shows promise, but more research is necessary to refine and strengthen urban living lab evaluations and comparisons.

Communicative planning and actor-relations

Two key aspects of communicative planning theory are providing concerned public stakeholders with a legitimate role in the decision-making process and a general wariness of expert or elitist manipulation.[59] Conversely, communicative planning theory has been critiqued for ignoring the unfair results that may be produced by open processes and for losing its critical edge once the theory is applied in real-world situations.[60] Practitioners should remain mindful of these challenges during the deployment of urban living labs.

Much like the concept of urban living labs, communicative planning theory stresses the importance of the process in ensuring the successful outcome of projects.[61] That is not to say that the process is only valuable in itself, or as a mere nod to democratic inclusivity. Rather, its value is partially derived from the manner in which the process serves to focus attention on relational interactions that can help to create the basis for action.[62] In communicative planning theory, there is considerable agreement that the outcome of a project is heavily contingent upon the actors who take part in the process. The actors are recognized as creative individuals and groups whose differing aims and needs affect the trajectory of a project and ensure a unique outcome. The outcome is also affected by a range of other actor-specific factors, including the commitment that they make to the project, the intensity with which they enter the discussion and their openness to differing visions. However, planning is largely shaped by leading actors and power relationships, be they within or outside of government – that is, those who have the capacity and incentive to use and invest their resources in planning processes and/or their material outcomes. This raises questions about the motives of the participants and their rationales for engaging in urban living labs, or, more fundamentally, what sorts of actors take part in such 'self-organized experiments'.

These central claims of communicative planning theory can be related to urban living labs in order to ask how they are related to the larger political context, because they work, as Boelens puts it in his proposal

58 Karvonen, A. & van Heur, B. (2014). Urban laboratories: experiments in reworking cities. *International Journal of Urban and Regional Research*, 38(2), 379–392.

59 Sager, T. (1994). *Communicative Planning Theory.* Avebury: Aldershot.

60 Fainstein, S. (2000). *Urban Affairs Review,* 35(4), 451–478.

61 See e.g., Forester, J. (1989). *Planning in the Face of Power.* University of California Press: Berkeley.

62 Healey, P. (2003). The communicative turn in planning theory and its implications for spatial strategy formation. In S. Campbell and S. Fainstein (eds). *Readings in Planning Theory* (pp. 237–255). Blackwell: Oxford.

for an actor-relational view of planning, 'beyond the confines of government'.[63] An urban living lab can be interpreted as a temporary, self-organized additional layer and mode of urban governance. Thus, one central issue is to ask how political urban living labs are, which addresses purely public issues within urban development (in comparison with more technological labs, which are often influenced by the economic interests of the involved companies). Several questions arise related to the associative forms of democracy suggested by urban living labs. Although they deal with public concerns, to what extent can urban living labs seek legitimacy or even accountability? In addition, power relationships, domination and exclusion develop in unique forms that are contextually dependent, and the results from the communicative planning process (and urban living labs as planning practices) are inherently locally specific.[64] In this vein, it seems valuable to consider urban living labs in the context of other urban development settings and processes working in parallel. It is also important to question the relationships between these settings and processes in terms of discursive power, institutional decisions and even long-term material impacts.

Conclusions

With this study, we want to initiate a critical debate and research engagement about the quality of governance in (urban) living labs and how they inform (or are engaged with) policies and politics. Urban living labs can be seen as an additional form of 'experimental' governance, because the rules of the game often are not defined in order to avoid restricting innovative and visionary thinking. However, they also bear the risk (as do other forms of governance) of becoming arenas of unequal expectations, power games and conflicts. Thus, it is vital that future research should investigate how these informal and thus soft modes of governance relate to formal, hard modes of government. However, in principle, the exploratory nature of urban living labs offers a promising method for balancing power in the context of participative urban development.

By trying to promote equal opportunities for all stakeholders, communicative planning theory seeks to ensure that those who have been traditionally ignored have the same possibilities as more powerful actors to have their voices heard in the process. This relates well to urban living labs, which try to foster creative unsettlement by harnessing the innovative energies of a wide array of actors in shaping urban development processes. Thus, urban living labs might function as empirical environments to help to develop communicative planning theory and practices. In any case, this needs to be explored in practice, particularly with respect to balances of power and stakeholder influence.

In summary, the core principles of urban living labs (outlined above as co-creation, exploration, experimentation and evaluation) offer an analytical and theoretical framework for understanding and positioning various informal self-organizing initiatives in contemporary urban development. Urban living labs as a planning practice or methodology have a number of merits in terms of defining innovative pathways for urban planning beyond business-as-usual thinking. However, caution must be taken to manage the inherent shortcomings of urban living labs with respect to democratic legitimacy, tendencies towards exclusiveness, and extreme temporality. In conclusion, we argue that urban living labs can be an environment for exploring new forms of innovative urban governance through critical engagements with communicative planning theory and an explicit focus on actor-relations.

4.2. Experimenting with new forms of urban governance in Vienna–Liesing[65]

This section synthesizes the research findings associated with implementing an 'urban living lab' approach in Liesing, a fast-growing suburban area of Vienna. The study contributes to an understanding of the urban living lab approach to negotiating conflicting local development goals and the inclusion of citizens in transport and mobility decisions. To this end, we will illustrate how the different elements of the urban living lab approach are addressed in existing (municipal) strategies and projects in the area. This will be exemplified by comparing five strategies, policies and research projects. The results of this analysis will be compared with local, interactive methods developed by the researchers for a local example of inclusive governance, with the thematic focus on mobility and transport. By summarizing the activities and experiences of this urban living lab, it is possible to understand better the theoretical implications and practical potential of the urban

63 Boelens, L. (2010). Theorizing practice and practising theory: outlines for an actor-relational-approach in planning. *Planning Theory,* 9(1), 28–62.

64 Healey, P. (2003). The communicative turn in planning theory and its implications for spatial strategy formation. In S. Campbell and S. Fainstein (eds). *Readings in Planning Theory* (pp. 237–255). Blackwell: Oxford.

65 Responsible partner: Austrian Institute for Spatial Planning (OIR).

living lab concept applied in a dynamic urban development context.

Research questions and methods

First, the urban living lab approach was used as an analytical tool to understand existing municipal policies and processes in a particular area. In this sense, policies were conceived of as hypotheses about the effect that a particular change or intervention will have in a defined territory. We focused on the following questions.

- What are the spatio-temporal boundary settings, actor-networks, contrasting forms of public engagement and demonstration exercises of different policies?
- How open to experimentation and co-creation is the existing policy context?
- How inclusive is the existing policy framework in Liesing?

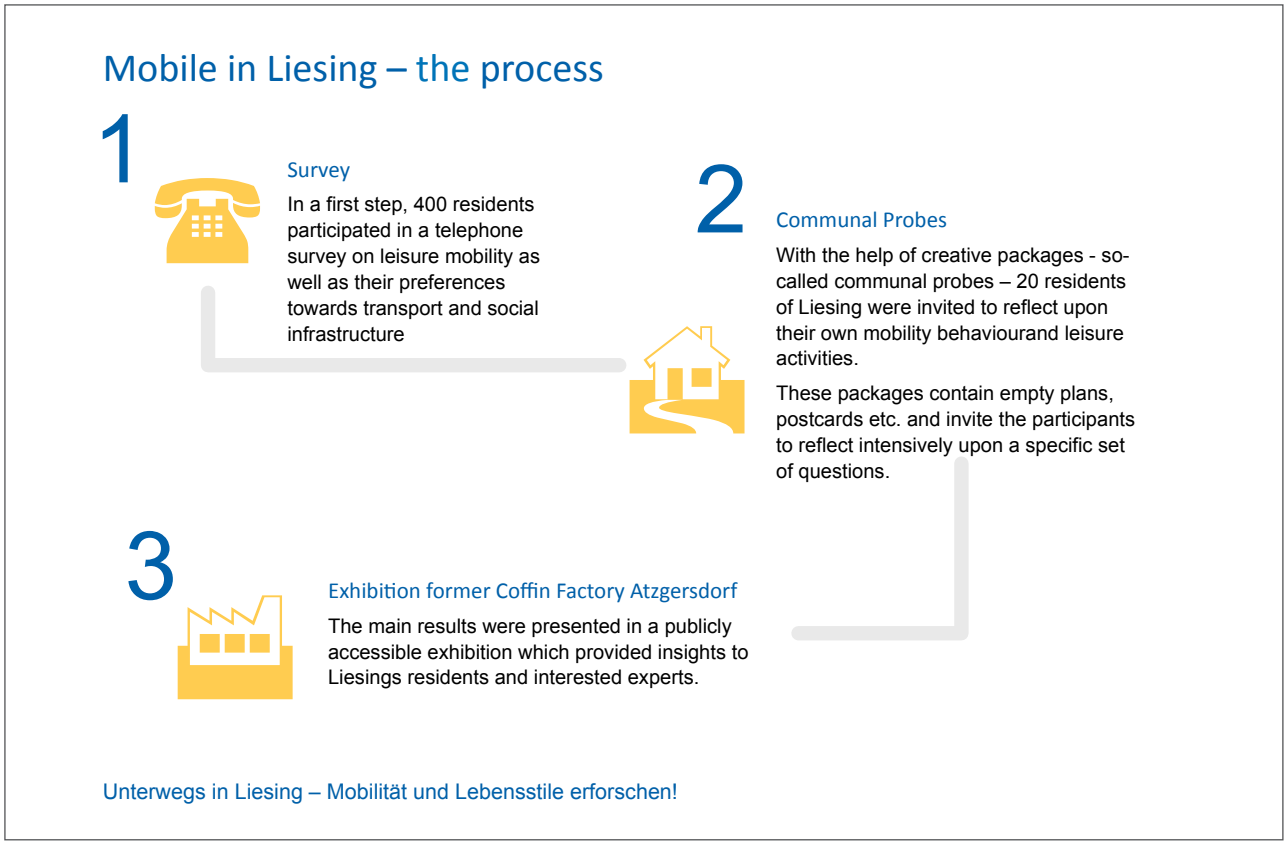
Second, the urban living lab approach was deployed as a policy instrument to allow experimentation with urban development issues. It involved an intervention by the researchers to promote the elements of co-creation, experimentation and learning. The guiding question was as follows:

- How can existing and incoming residents be motivated to adopt sustainable mobility patterns that will guarantee long-term quality of life in the neighbourhoods?

We applied the urban living lab approach as an analytical tool with five policies that take diverse approaches to urban mobility and also differ with respect to their temporal and spatial scope. The analysis to address the above research questions was based on expert interviews with key actors in the respective processes/interventions and on a review of the relevant policy documents.

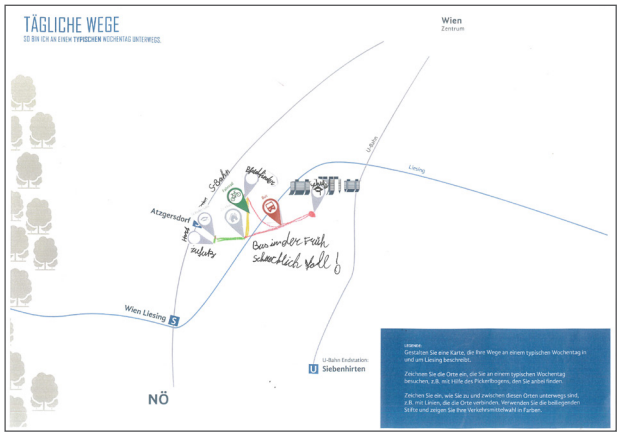
To use the urban living lab approach as a policy instrument, we designed a three-step process that started with a telephone survey of 400 Liesing residents on mobility lifestyles and behaviour. The results of this survey formed the backbone of another analytical investigation that involved the application of so-called 'communal probes' that allowed for co-creation among the participants as well as for qualitative verification of the quantitative survey results (see Figure 6).

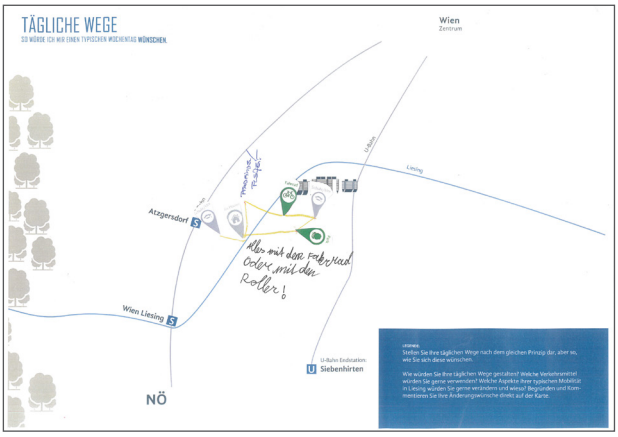
Figure 6 *Mobile in Liesing – the process*[66]



66 Source: Austrian Institute for Spatial Planning (OIR).

Figure 7 *Participants describing their trips on a usual day and their desired mobility chain*





Communal probes are a creative approach to capture citizens' perceptions and opinions about Liesing's mobility. The tool was designed in the spring of 2015 and used with 20 citizens. The study's aim was to involve citizens in creative self-reporting activities to collect insights about their perceptions of Liesing's mobility system and to identify particular problem areas and suggestions for improvements. The tool incorporates a number of (open-ended) questions that participants are expected to answer creatively using the 'Probes Package'.

The combined results from these analyses were then transformed into a public exhibition that was shown in a former factory in the development area. The project was named 'Mobile in Liesing – exploring lifestyles and mobility' (Unterwegs in Liesing – Mobilität und Lebensstile erforschen), and it concluded with the public exhibition in September of 2015, approximately one year after the process had started. In addition, the research team conducted additional expert interviews and organized a workshop with local neighbourhood management organizations from other districts in Vienna to identify best practices in the local governance of mobility lifestyles.

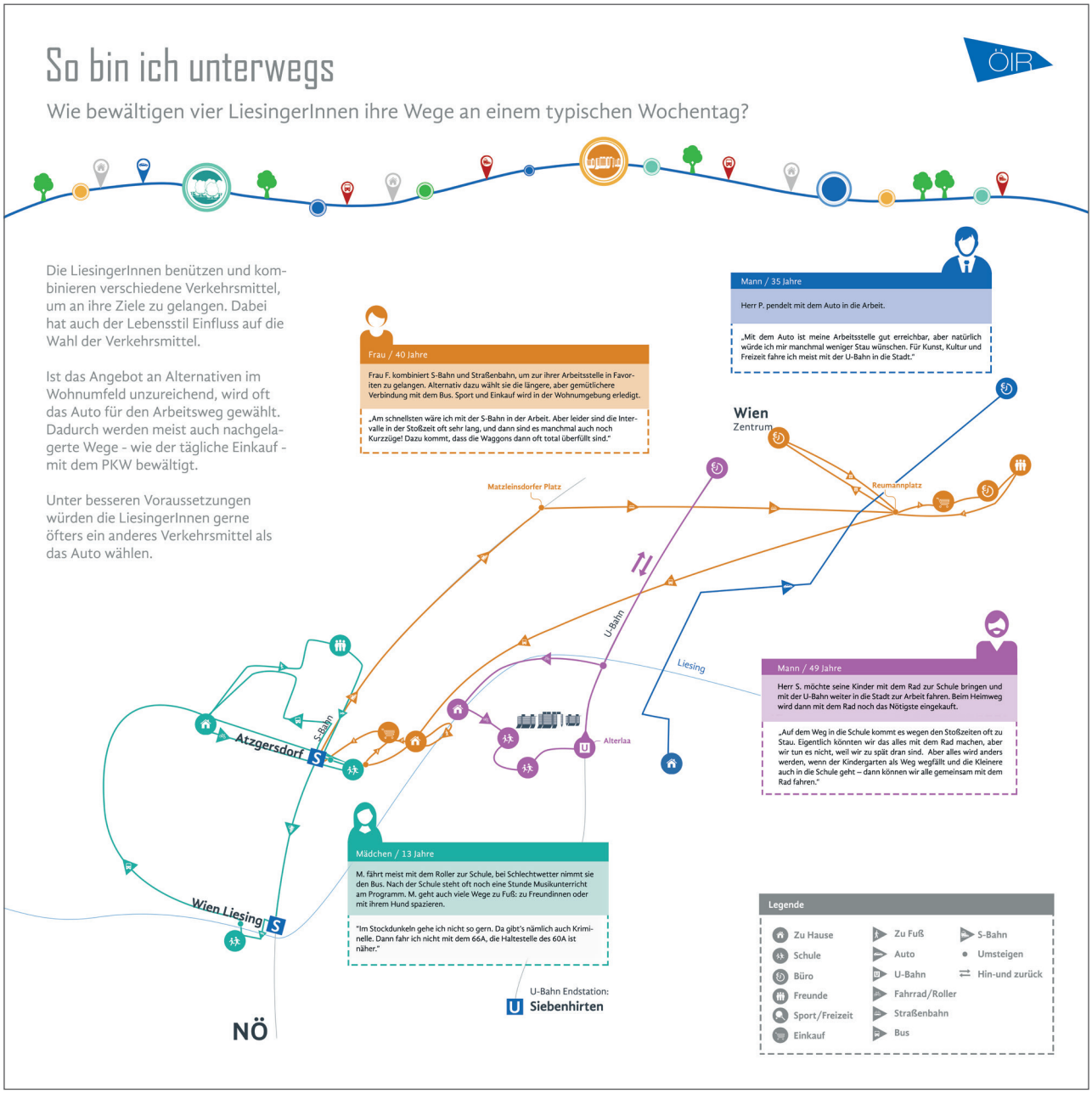
Main results

As a federal province and municipality, Vienna has a long history of quasi-autonomous policy-making in the regulation of the built environment. Liesing is a functionally heterogeneous urban area on the southern periphery of Vienna. It is characterized by historic neighbourhoods (the former villages) that give the area its identity and by the absence of a dominant urban centre. Since the 1960s, the area has seen increasing industrial development. A major challenge for the area concerns transport and mobility. Liesing has a disproportionately high percentage of motorized traffic, and the road network and transport infrastructure are at capacity limits because of cross-boundary traffic to suburban areas outside of the city.

There are many empty spaces in the interstices between the historic parts of Liesing. These reservoirs of past and future spatial development potential for Vienna define the area as a prominent suburban intervention field for citywide planning experiments. Liesing's urban development potential was further highlighted in Vienna's 2005 urban development strategy, in which parts of Liesing were selected as a target area. The focus of that development strategy was the restructuring of an industrial site and the provision of new housing for about 28,000 new residents, a significant increase over the current 90,000 inhabitants. The planned increase in density and fears of disastrous traffic congestion sparked a set of conflicts between the municipal apparatus, existing residents and the local borough authority. The conflicts concerned the image of Liesing as a largely green suburban and rural territory, and the likely changes that densification would bring, including impacts on the quality of life, the need for infrastructure improvements and the overload of a transport system that was already at capacity. The rationale for focusing on sustainable mobility behaviour was driven by the particular local context in which mobility behaviour is an important facet but has yet to be addressed.

67 Source: Austrian Institute for Spatial Planning (OIR).

Figure 8 *Exhibition Object: 'That's how I move around*[68]



To apply the urban living lab approach as an analytical tool, we investigated the following five policy experiments.

- Local Agenda 21 (a non-governmental organization fostering civic participation)
- Perspektive Liesing (a city-driven project leading to a strategic development plan for Liesing)
- Transform+ (a research project guiding smart city transformation)
- Standpunkt Liesing (neighbourhood management for the industrial area)
- Target Area Management (a municipal co-ordination unit of urban development in Liesing Mitte)'[68]

These five projects have different areas of impact in Liesing and time horizons that range from 10 years (Local Agenda 21) to six months (Perspektive Liesing). All five projects have a moderate to high degree of risk taking and experimentation. The widely differing opportunities to incorporate feedback limit these projects' adaptability. They also differ in the types of stakeholders participating. Indeed, citizens are only really able to participate in the Local Agenda 21 project, whereas most of the other projects are confined to mu-

68 Source: Austrian Institute for Spatial Planning (OIR).

nicipal and expert stakeholders who merely keep the population informed. If they were integrated, such as in the case of Perspektive Liesing, the time frame was too short to create the conditions for a laboratory situation. In this regard, it is notable that the Target Area Management project, which was intended to co-ordinate development efforts with all relevant actors on the ground in Liesing, proceeded without the inclusion of the local borough as a political entity or the current residents in the area. The fragmented character of engagement efforts has led to different political goals and objectives. Overall, there is a certain degree of dissatisfaction with the current organizational arrangement.

The urban living lab approach understood as intervention through the experiment was mainly driven by the following hypotheses about change in the area:

- Lifestyle and mobility patterns play an important role in transforming the future mobility behaviour of Liesing's residents.
- Knowledge about mobility behaviour can be co-created with local residents.
- Co-creation can be a learning experience for individuals and the policymakers involved, and it can contribute to the institutionalization of participatory processes.

Several effects of these experiments were expected, including being able to show residents how they could benefit from reflecting on their own mobility behaviour, showing municipal and local politicians the utility of risk-taking and experiments that involve local residents, and finally, showing transport planners the utility of moving from production-oriented to more consumption-oriented views of the local transport system.

Exploring the Mobile in Liesing experiment from an urban living lab perspective

The experiment involved actors from the municipal administration, neighbourhood management entities, local organizations and the local borough authority. In operational terms, the project team benefited from the support of the new cultural venue in Atzgersdorf, which integrated the exhibition in their opening days. A former coffin factory had been used for other project events, such as for Perspektive Liesing, so it was fortunate to be able to locate the intervention in a relatively well-known cultural space. The combination of these particular actor-networks proved to be efficient and effective in setting up the intervention.

The research team was supported by letters of intent from two municipal departments, but there was no political support from the local borough. However, the support from the municipality was weakened by a stalemate between the municipality and the local borough council. The research team compensated for this by making efforts to keep the local borough council informed about, and involved in, the project.

In contrast to other strategic projects, this intervention was centred on the idea of integrating residents in the production of knowledge. The participation of local residents was a constitutive aspect of the preparation and implementation of all of the steps necessary to conduct the experiment. Although engagement efforts achieved their objective of involving citizens well beyond the level of information, less attention was given to the diversity or representativeness of the participants. Quantitatively, the engagement efforts met their target. However, the expectation of drawing in actors beyond the existing actor constellations through co-operation with the cultural centre was frustrated by low interest in the venue's opening. Moreover, although contact with residents was continuous through the survey and communal probes, the fact that the exhibition was only open for three days considerably reduced the possibility of attracting new segments of the population.

The analysis indicated three types of methods in the Mobile in Liesing experiment: First, there were methods that were closed to co-creation (analysis of existing strategies; survey and impact analysis); second, there were methods that allowed only limited opportunities for co-creation of scientific results with stakeholders and experts (best-practices catalogue, discussion with scientific community and policy experts); and finally, there were methods that were highly performative in allowing the local population to co-create highly relevant facts (communal probes and exhibition). Hence, we can argue that co-creation was not a consistent feature of the process; it was restricted to neatly planned instances and events that were specifically designed to allow co-creation. Compared with the other strategies that we examined, this experiment did indeed exhibit dimensions of partnership and tokenism that went above and beyond what was done before, except for the Local Agenda 21 project.

With respect to learning, Mobile in Liesing was an attempt to routinize engagement with urban development issues at a certain level of investigation between the bottom-up and top-down levels of city planning. At this time, there is no evidence of institutional learning other than the feedback that the policymakers received in the course of the experiment. This feedback points in two directions. On the one hand, the need for a certain dimension of citizen engagement throughout the pro-

ject was recognized, but questions remain about what such participatory processes should look like concretely, which resources could be mobilized to foster them and at what levels these processes could be situated. On the other hand, conflicting relationships between the city and the local borough council were not set aside, as these entities depend upon decisions that are made outside of the individual actors' scope of power. These conflicts revealed political and even cultural frameworks that go beyond the concrete laboratory situation created in the Liesing case.

There was evidence of individual learning in the feedback from participants in the communal probes. Interviews with participants indicated that the communal probes stimulated people actively to perceive their mobility behaviour and to reflect on possible ways to change it. The communal probes also helped to stimulate more holistic perceptions of the transport system, and hence they promoted a better understanding of its problems. Finally, the communal probes allowed participants to start discussions in their families and with their friends and acquaintances. Another check came with the transport planner of the area. From the professional view, a great deal of the participants' local observations and the ideas created seemed to be plausible and relevant as input for the design of measures to improve the district´s transport system.

Lastly, there were learning effects for the research team too. Importantly, although this examination of mobility behaviour revealed new perspectives on the transport issue in Liesing, it became evident that questions related to the built environment and the sheer supply of infrastructure are very relevant to the high population growth and the capacity limits of the area's transport infrastructure. Thus, to some extent, the experiment provided an opportunity to reframe existing issues, and in so doing, it confirmed some results of the Perspektive Liesing project, as well as others. Apart from this content-driven perspective, the researchers personally trod new ground by experimenting with methods that they had not mastered before: designing and analysing communal probes, and implementing an exhibition were firsts for the team. Through the research team's internal discussions about the process, the design and the outcomes not only reverberated through the team but also made an impact on the entire firm. It became apparent that working with these participatory methods adds to more detail, but it also creates a more holistic view of the challenges in the area.

Conclusions

In this study, we reviewed different policy approaches to experimentation in the Viennese neighbourhood Liesing, and we critically evaluated them from the vantage point of the existing literature on urban living labs. We conducted this investigation with two research perspectives in mind:

- The urban living lab as an analytical concept: as a way to understand, compare and evaluate critically existing (municipal) strategies, policies and projects.
- The urban living lab as a constructivist approach: as a way to create an opportunity for experimentation on urban development issues (in the context of a research project).

Our analysis of different policy strategies and instruments revealed some Liesing-specific outcomes and some general observations.

Certain urban areas are more suited to experimentation than others. As a fast-growing district, Liesing was an excellent site for experiments on a new vision for the city. The analysis of the different processes used in the area illustrates the lack of guidance that the projects had, which ultimately limited the achievements of the different sectoral strategies. Strategic-level discussions about future development scenarios did not immediately lead to a stable and secure set of strategic and operational targets for the area. The exception was found in the functionally independent Standpunkt Liesing management project, in which political backing for a strategy that was autonomous from the area's wider development perspective was available since its inception. Notably, in the case of Transform+, the absence of a clear target framework made the calculation of energy scenarios for the area complex if not impossible. Thus, the shaky and contingent nature of the strategic context may be a precondition for experimentation and laboratization to take place, but it also created added insecurity among the actors when security was needed.

Urban living labs temporally conflate strategy and implementation. To some extent, the environment embodies a planning situation in which strategy and implementation temporally coexist, and where situatedness, contingency and change orientation, as the main evaluative characteristics of the urban living lab approach, were part and parcel of the process. A crucial question about the effectiveness of laboratory situations in urban development contexts relates to the ability of such laboratories to exist without metagovernance that could monitor, compare and guide the different experiments on the ground and eventu-

ally translate them back to the city level. In principle, the municipal target area management was supposed to be such a monitoring entity, but as the project revealed, it could not deliver its main objective to create consensus among the main actors regarding an acceptable development vision for the area. Thus, there is a question about how far governance issues can be addressed within the parameters of a given experiment and whether certain conditions need to be in place to guarantee the effectiveness and utility of policy experimentation in a particular area.

The positive effects of laboratization, such as inclusion, are difficult to achieve in an otherwise conflicting political environment. It was in this policy environment that the (municipally driven) Perspektive Liesing project first made a co-ordinated effort to get local politicians and municipal figures to agree to a set of local development goals. However, the Perspektive project was neither targeted at the local population directly nor had a sufficient time frame to allow for co-creation and/or major changes in attitudes to happen. Against the backdrop of these developments, an organization such as Local Agenda 21, which is largely driven by citizen self-organization, was unable to pass on feedback, knowledge and information to the political level. Thus, the difficulty of citizen inclusion in the various policy processes in Liesing may be explained by several factors. The first factor concerns the absence of inclusion as a normative principle of the urban development processes in the area, which have mostly been dominated by technico-rational questions. The second factor concerns the belief that the existing policies, projects and instruments can harness the citizens' point of view. This does indeed confirm the hypothesis concerning the weak status of relational concepts in the corporatist planning paradigm. The final factor concerns the lack of framework on which any debate about future development goals could be based.

Testing the applicability of the urban living lab approach in an area with no a priori willingness to engage in experimentation and where there is great conflict about development goals produced mixed results. Formally, we achieved a number of desired effects that are characteristic of the living lab approach: we created the space for co-creation and experimentation, and allowed for learning about individual mobility behaviour; and we balanced the capacities to experiment locally. Summarizing the results of this process, the intervention has certainly written a part of the local development narrative, but it has not completely rewritten it. Limited by the research-project approach, the Mobile in Liesing experiment could not change the given actor constellations. At the same time, this project was the first strategic process of its kind (other than Local Agenda 21) in which the participation of the local population featured as a prominent intervention principle. Indeed, we could well conclude that such experiments never completely alter situations or strategically reorient them, but they set an example, and by harnessing existing potentials, they create possibilities for change.

We have also seen that the existence of secure, agreed upon framework conditions that are accepted by the most important policy stakeholders and by the population are an essential precondition for experiments to contribute meaningfully to the policy arena. In the absence of a concrete urban development policy (as in the case of Liesing) with a set of agreed targets for a circumscribed area, an urban living lab experiment can only serve as a partial substitute. Although it is possible to reframe sustainability goals derived from distant targets and government policies into concrete and achievable actions that can be undertaken by a wide variety of urban stakeholders, the local development narrative can only be rewritten if such a narrative actually exists. In other words, sometimes a new organizational layer, a new institution or a new set of rules may be needed that is beyond the capacity of the laboratory situation to provide. Although this experiment allowed us to define this need (probably in a way that we could not have addressed through other means), from within the laboratory boundaries, we could not influence the institutionalization of new rules.

4.3. Exploring Experiment Stockholm as an urban living lab[69]

In this section, we discuss findings from a case study that was informed by the 'urban living lab' notion, which is emerging across Europe, as well as by 'communicative' and 'actor-relational' planning theory. We analysed the development and implementation of the Experiment Stockholm exhibition in 2015, which used artistic exhibits and a number of forums to generate creative narratives for the sustainable urban future of the Swedish capital city-region. The Experiment Stockholm exhibition was facilitated by the Stockholm-based foundation for art, architecture and urbanism, 'Färgfabriken' (named after the paint factory that used to occupy the space). Among the various exhibitions and related projects and activities in which Färgfabriken has been involved since 1995, this exhibition was the third of its kind to illustrate urban planning issues and potential futures for the Stockholm city-region.

69 Responsible partner: Nordregio.

Table 2 *The thematic scope of Experiment Stockholm*

1	City, suburb, countryside
2	Interaction and integration
3	Nodes and hubs
4	The 'bigfoot'
5	Dialogue is not monologue
6	Informal methods
7	Varied building, varied functions
8	Beyond the car age
9	Planning for the unplanned

During 2013 and 2014, the preparatory work was tackled, which specifically included former and new collaborators and funding partners in the Stockholm city-region, along with the identification and formulation of a number of questions and themes. Two so-called partner meetings, together with a number of other workshops, seminars and related activities were arranged during spring 2015. These were intended to form an 'inspirational ground' on which parts of the exhibition could be based.

Nine themes (see Table 2, above) were distilled from a number of bilateral meetings and discussions, primarily between Färgfabriken and the 35 partners involved, who represented (among others): five municipalities in Stockholm county (Hanninge, Knivsta, Sollentuna, Nacka and Stockholm); the Mälardalsrådet, a non-profit special interest organization for municipalities and the five county councils around lake Mälaren; the Swedish Environmental Protection Agency; the Nordic Building Exhibition; the Swedish Architects Union; three research institutions; and five private companies in the fields of environmental consulting, architecture, construction and real estate. These 35 partners financially supported the exhibition project at varying levels and thereby guaranteed themselves 'a say' in the preparation and implementation of the exhibition.[70]

THE CONCEPTION AND SCOPE OF EXPERIMENT STOCKHOLM

'[…] Experiment Stockholm […] seeks to examine and experiment with strategies and solutions for dealing with the challenges of a rapidly growing Stockholm region. […] Experiment Stockholm is a laboratory made up of the exhibition spaces, of seminars, debates and other events. We hope many people will meet in this experimental environment where we challenge old ways and propose and test new models and ideas together.'

The text box presents the main part of the official opening statement on Färgfabriken's homepage,[71] which describes what Experiment Stockholm is about and its main intention. It coincides nicely with the three categories that characterize urban living labs (see section 4.1 above) and that structure the analysis below. We focus specifically on six so-called 'experiments' in the exhibition, although there were many other events, seminars and artistic exhibits presented in the exhibition spaces. These experiments were essentially workshops that were organized by one of the partners (typically, municipalities in concert with Färgfabriken). The workshops addressed one or two of the nine themes (see Table 2) and were intended to develop various futures and planning solutions for existing neighbourhoods.

Research questions and methods

- How were 'co-creation' and 'exploration/experimentation' facilitated in the exhibition and practised by the participating stakeholders?
- Which tangible or non-tangible outcomes were co-created, and to what extent did (or will) the knowledge and learning generated impact on urban policy or governance practices in Stockholm?

70 Interview Färgfabriken, 2015.

71 Färgfabriken (2015). Available from: http://www.fargfabriken.se/en/projects/experiment-stockholm-eng [Accessed 16 December 2015].

- How can we describe the institutional and organizational context of Experiment Stockholm?
- What can be said about the emerging actor-networks and power relationships, the inclusion and exclusion of stakeholders, and opportunities (and barriers) to making them co-creators of knowledge?

This case study is largely based on participant observation, as the researchers were involved in the preparation and implementation of the exhibition and thus had 'direct access to the empirical field'. In addition, a number of interviews were conducted with Färgfabriken and a number of the 'partners' involved (see below).

Main results

The main goal for the two partner meetings prior to the exhibition was to solidify further the nine proposed themes (see Table 2) among the official partners and to discuss trends and challenges, visionary pathways and potential innovations. Färgfabriken had defined and briefly introduced the themes and the methods, but it did not specify them in detail, which allowed the participants a great deal of freedom. However, the nine themes were not questioned or reformulated; rather, they were made concrete with some state-of-the-art reflections on cities from a 'social cohesion' and green-biased perspective. This bias can be traced back to the chosen themes but also to the selection of the participants, which seemed to follow a 'normative agenda' of Färgfabriken (albeit one that was not strongly articulated).[72]

Co-creation

The various experiments were essentially closed clubs, as they only included the official partners and some invited guests. Nonetheless, because of the variety of partners, these experiments can be regarded as multidisciplinary collaborations. However, the majority of the participants came from municipal urban planning departments, so most of the experiments were clearly dominated by 'physical' planners. This was further strengthened by the presence of invited building and construction companies. Most of the experiments conducted group-work (often in 4- to 8-person gatherings, with the usual dynamics of such groups) and gave presentations to all of the participants (typically, 30 to 50 people), followed by discussions. As with the preparatory meetings, there was a striking use of rather conventional methods. There was a clear focus on 'shaping' and 'designing' specific places related to actual local planning projects and challenges by using overview maps of the existing physical structures, which were then remodelled with the help of pencils, paper and a number of toy blocks.

Figure 9 *Workshop preparing 'Experiment Stockholm', Färgfabriken, April 24, 2015*

72 Interview Färgfabriken 2015.

Figure 10 *Experiment/workshop: Nodes and hubs, Färgfabriken, November 5, 2015*

Exploration and experimentation

The topics in the various experiments were introduced by guest speakers (typically, consultants) as well as representatives from Färgfabriken, followed by a further introduction by the organizer (usually a representative from a municipality). It is noteworthy that the tasks conveyed to the group were neither carefully defined nor particularly questioned by the participants. Eventually, because of the rather conventional (and thus for most of participants, familiar) methods (see above), the various groups immediately commenced with the above described remodelling of the given neighbourhoods. This, together with the limited time for the tasks (often 45 to 60 minutes for one task), certainly restricted the scope of exploration for each issue as well as the scope of experimentation. Because the 'experiments' were not underpinned by commonly agreed upon understandings, were limited by rather conventional methods and focused on concrete and well-known planning problems, it was rather difficult for the groups to switch to a mode of 'unforeseeable' future-making.

Evaluation

We learned through our interviews that in two cases, the results from these experiments have informed one informal policy document as well as one draft planning scheme. Others have reported that the experiments helped them to 'think outside of the box', particularly through multidisciplinary networking, which otherwise hardly takes place in their lives as planning practitioners. Some of the organizing municipalities have said that the experiments particularly supported (in-house) discussions of topics at hand because the experiments offered new perspectives. One of the municipalities even utilized Experiment Stockholm as a staff training opportunity by attending the various events, seminars and experiments (as much as possible) to make the best use of the membership fee that they paid to become an official partner of Experiment Stockholm.

Conclusions

The 'meetings' and 'experiments' described here illustrate the important role of more organizational issues in practising 'co-creation' and 'experimentation' within multidisciplinary networks. First to be mentioned is the functioning of the networking platform, which includes the role and performance of the facilitator as well as the moderator. One critical point for reflection is the membership criteria, which included those who were willing to spend their resources (money and time) but excluded others. As a consequence, the temporary multidisciplinary networks that were established can be characterized as an exclusive, if not elitist, urbanist community within the Stockholm city-region.

On the positive side, we can certainly note that Experiment Stockholm created a learning environment with a great deal of networking potential (not only for members in the experiments but also for other interested 'persons' in the numerous seminars and events,

as well as visitors to the artistic exhibition). In addition, some of our respondents mentioned that the various activities have helped them to think in a more comprehensive way about urban planning and thus to overcome the prevailing silo mentality in urban planning, opening up avenues for cross-sectoral co-ordination.

Our observations of Experiment Stockholm suggest that this soft, temporary and to some extent experimental mode of governance has the same problems with transparency, legitimacy, durability and equality as similar attempts to strengthen participative planning approaches that have been conducted in parallel with formalized urban planning procedures. First, as we have seen, Experiment Stockholm had a rather individualistic approach – not only was participation limited by the membership criteria but also the individual capacities of those who were included played a crucial role. This was evident in the observed group work dynamics (and their inherent selective processes), the members' presentation and communication skills, and the fact that such settings clearly privilege charismatic and knowledgeable personalities. Another point is the durability of the established actor-networks, which need to be carefully maintained by follow-up activities and the creation of new windows of opportunity for co-creation. All of these critical points need to be carefully considered when appraising 'urban living lab-like' approaches, as the case of Experiment Stockholm illustrates. We argue that this example can indeed be characterized as a soft mode of urban governance that can help to unlock creativity and to open up avenues for experimentation and alternative solutions. We emphasize, again, that most of the interviewed partners regarded this aspect of the process positively. However, we must be careful not to overvalue such approaches, as our example implies a rather exclusive expert forum instead of a governance mode that could be seen as open and broadly inclusive. In addition, our example illustrates the significance of suitable and unconventional methods, which otherwise considerably limit the innovative capacity of the participating stakeholders and their search for alternative solutions. Hence, we argue that if considered as a complementary approach to public urban planning, the applicability and legitimacy of such soft and experimental modes of governance as discussed above need to be carefully considered.

5. Main conclusions

Sustainable urban areas and lifestyles

The research results on the theme of sustainable urban areas and lifestyles indicate that there is still a strong focus on technical infrastructural changes and a lack of integrated policies. The main understanding is still that behavioural changes come as a consequence of technical changes for eco-efficiency. There were only signs of increasing awareness among policymakers for the need to understand the context in which unsustainable behaviour arises. Differences were notable between housing and living strategies on the one hand and mobility and transport strategies on the other hand, and strategies for fostering integrated production and consumption were more developed in the latter. While some country-specific variations were seen, the differences seemed to be more important at the level of policy documents than that of planning traditions.

Sustainable urban development policy is embedded in an environment in which policy actors are traditionally segregated into different sectors. In spite of desires to integrate social and cultural perspectives into urban sustainability policies, there are few signs of institutionalized forms of strategic partnerships at the city level. In Stockholm and Vienna, municipal authorities have gone beyond the business-as-usual approach in certain instances, particularly when it comes to new development projects. However, these approaches are mostly limited to the project level, and there are difficulties in integrating experiences into higher-order strategic documents or other projects.

The research leads us to the following conclusions about spreading knowledge from projects to policymaking for sustainable urban lifestyles:

- Make the effects of changed behaviour visible on a human scale.
- Target specific lifestyles without stigmatizing them. Sustainable consumption policy needs to allow for learning, rather than segregating different lifestyle groups.
- Integrate key individuals or partners as drivers of integration into citywide strategies.
- Understand that citizen participation and the role of citizens varies. In some strategies, citizens will be co-decision-makers, whereas in others. they will simply be consulted.

Individual lifestyles and consumer practices are increasingly seen as a way to address sustainability challenges, and the importance of individual consumption choices for promoting sustainability has been emphasized by both policymakers and the media. We need to rethink our ways of living, our consumption patterns and travel behaviours, and how we organize our everyday lives. This is perhaps more radical and demanding than we can currently imagine and manage. Framing environmental concerns as the responsibility of the individual has implications for how planning for sustainable lifestyles is developed. For sustainable urban development, it is evident that focusing on the urban form or technological solutions is insufficient. However, we conclude that it is also insufficient simply to shift the focus from urban form and technological solutions to changing individual behaviour. Instead, to promote sustainability, we need to improve our understanding of the actual everyday practices of urban inhabitants and to develop policies aimed at practices, not structures or agency.

If we focus on a specific case of urban development, we can see how urban sustainability and lifestyles are conceptualized and perhaps also materialized in the built environment. In the case study of the plans for a new neighbourhood in Årstafältet in Stockholm, we concluded that sustainable urban development in Stockholm has moved on from old brownfield areas to developing existing green spaces. In addition, we could see how the division between city and suburb lives on in planning, and the two categories are associated with certain respective lifestyles. A sustainable lifestyle is an urban lifestyle, and the compact city is seen as the only place for it. Judging from the planning process and visions that we observed, there is no strong vision of the new neighbourhood being an area for alternative lifestyles. The detailed review of the planning process revealed an example of planning as land allocation and development, with the strong presence of developers

and architectural visions. Although the architectural competition and the master plan for the area yielded an initial vision and general idea for the development of the new neighbourhood, land allocations to developers always preceded the formal planning processes. In addition, the planning process appears to have been characterized by citizen participation, but it was more in the form of protests than as a formal influence on decision-making. This case study made us reflect on the weak vision of sustainability, on where actual planning takes place today, and on what the consequences of these observations are for urban sustainability.

In this project, we also approached urban sustainable lifestyles via a behavioural analysis. Using a survey that focused on mobility, transport and housing in Liesing, Austria, we discerned four distinct 'lifestyle types': 'Suburban', 'Urban', 'Neighbourhood-oriented' and 'Ecological'. The Suburban cluster represented respondents who had an affinity for car transport, whereas the 'Urban' cluster represented respondents who had an affinity for public transport. The Neighbourhood-oriented respondents rated all modes of transport as equally important and therefore were labelled multimodal. People in this category were more likely to own a car, and they had the smallest share of members without a driving licence. The Ecological respondents had a strong preference for bicycling and walking infrastructure and for public transport. Their orientation towards cars was below average, and they had the largest share of members without a driving licence. Overall, this survey showed that lifestyle, decisions about where to live, and the character of the urban environment often are mutually dependent. In Liesing, the choice to live in a lower density environment, remote from the city centre and close to green spaces, represents a certain lifestyle for which accessibility is less important. A shift away from car use can be encouraged by increasing freedom of choice for different modes of transport with incentives and restrictive planning measures. Improving accessibility with public transport or bicycle infrastructure in the district and better connections between local centres and the main transport corridors were important prerequisites for changing mobility patterns in this case.

Urban development, planning and transportation

The main focus in this theme was on transit-oriented development (TOD) and on long-term relationships between mobility, transport and urban development. The literature review of TOD produced several conclusions. First, the impact of the relationship between land use and transportation depends upon the existing conditions in a city or region when new transportation is developed. Second, the result of studies on land use and transport interactions can differ depending upon the intervals investigated. Third, the spatial scale of study areas also played a role regarding the significance of the land use/transport relationship. For example, the opening of new railway stations can attract population at a local scale, but it might lead to population decentralization or suburbanization at the metropolitan level. Fourth, the kinds of indicators that are used to measure effects matter immensely to the outcome. Fifth, we need further knowledge about the relationships between public transit and land use. Sixth, although many studies model population density in general, and residential, employment and commercial densities in particular, only a few studies have measured long-term changes in land cover.

A closer analysis of the relationships between planning and transportation development in Europe (the Netherlands, Austria and Sweden were used as examples) with a particular focus on TOD principles in planning concluded that TOD (whether called by other names or not named at all) has been an intrinsic policy principle since WWII. The extent to which the TOD concept can find resonance in a European context is closely related to the prevailing societal and planning environments. Both post-war suburban development and later inner city regeneration show TOD planning traits. Today, policy discourses show support for sustainable and resilient urban and regional development, and they rely heavily on TOD concepts. However, it is not clear whether the actual developments based on these concepts lead to more sustainable and resilient cities.

Another empirical investigation in this project analysed how access to transport infrastructure, land use, individual socio-demographic characteristics and travel behaviour had evolved in relation to each other in The Randstad from 1980 to 2010. Variables such as age, gender, education, income and car ownership were related to kilometres travelled. This study indicated that there might be an emerging paradigm shift towards a slowing acceleration in the use of motorized transport modes. Instead, people are increasingly using trains to travel longer distances. This trend could serve as an argument for further investments in railway infrastructure, such as for commuter trains and high-speed trains. This study also showed that there is potential for increasing use of electric cars and bikes.

Urban living labs

Using an urban living lab type of setting, we can experiment with a number of issues relevant to urban policy, such as mobility behaviour, sustainable neighbourhood development and the inclusion of various stakeholders and individuals. In principle, the exploratory nature of urban living labs offers a promising method for balancing power in urban development between citizens, planners, policymakers and the private sector. However, as social platforms, urban living labs bear the risk of becoming an arena of unequal expectations, power games and conflicts. We believe that the urban living lab approach can encourage active stakeholders and citizens in the co-creation of knowledge about sustainable urban planning and lifestyles, but in and of itself, this method clearly does not guarantee a democratic or legitimate process. There are still assumptions made and alliances formed that include and exclude actors and ways of life.

As an analytical concept, the urban living lab is a way to understand, to compare and to evaluate existing urban strategies, policies and projects. As a constructivist approach, it creates a social platform on which experimentation with urban development issues can occur. In this research project, we approached the urban living lab both as an analytical concept and as a practice tool for the development of urban exhibitions in Vienna–Liesing and Stockholm.

From the Vienna–Liesing case, we concluded that certain urban areas are more suitable for experimentation than others. For example, as a fast-growing district, Vienna–Liesing is an excellent site for experimenting with new urban visions. The intervention has written a part of the local development narrative, but it has not completely rewritten it. The Mobile in Liesing experiment could not change the given actor constellations, even though inclusion was an important principle. Thus, we may conclude that such experiments do not alter situations completely or strategically reorient them. The positive effects of urban living labs, such as inclusion, are difficult to achieve in an otherwise conflicting political environment, and urban living labs may temporally conflate strategy and implementation.

The urban living lab in Stockholm involved the preparation for, and implementation of, the Experiment Stockholm exhibition. As researcher participants, we both contributed some of the content for this exhibition and investigated it as a case of co-creation and experimentation in urban development. We saw a social platform and an event that offered a learning environment with excellent networking potential for the participants. However, the event also had an exclusive character, with a participant group that reflected an urbanist (perhaps even elitist) community in the Stockholm city-region. Nevertheless, the participants did find that the exhibition and its activities helped them to think in new ways about urban development. We want to emphasize two things that can secure this new thinking: the proper organization of the space and the events, including its facilitators and moderators; and the importance of suitable and perhaps unconventional methods to provoke visionary thinking and alternative solutions to planning problems. We argue that this example can be characterized as a soft mode of urban governance that can help to unlock creativity and to open avenues for experimentation and alternative solutions. However, care must be taken not to overvalue such approaches, as our example produced a rather exclusive expert forum instead of a mode of governance that might be associated with openness and wider engagement.

Appendix: Deliverables

CASUAL Policy Briefs

No 1. Urban policies for sustainable living and consumption.

No 2. Transit-oriented development and sustainable urban planning.

No 3. Experiments and innovations within 'soft' urban planning.

No 4. Planning for sustainable lifestyles: political limitations and policy possibilities.

Public project presentations

Envisioning sustainable lifestyles in Stockholm's urban development. Presentation at Stockholm Resilience Centre, Stockholm University, April 20, 2016.

Transit-oriented development: an historical perspective from the Randstad. Presentation at the 'Experimentation Seminar on Nodes and Hubs' in Färgfabriken, December, 2015.

CASUAL: Co-creating Attractive and Sustainable Urban Areas and Lifestyles. Presentation for Nordregio Board of Directors in Copenhagen, November 23, 2015.

Tensions on the field (in Swedish: Spänningar på fältet) Presentation at Research Meets Practice – to include the residents in the planning of Stockholm, a breakfast seminar arranged by Stockholm Resilience Centre, Nordregio and Färgfabriken in Stockholm, November 9, 2015.

CASUAL: Co-creating Attractive and Sustainable Urban Areas and Lifestyles. Presentation at the Department of Human Geography, Stockholm University, October 22, 2015.

CASUAL: Co-creating Attractive and Sustainable Urban Areas and Lifestyles. Presentation at JPI Urban Europe Projects Meeting in Brussels, October 14, 2015.

Exploring laboratories – the what and the why. Presentation at the ARTS Transition Platform Meeting in Stockholm, October 7, 2015.

Urban Living Lab results. Presentation for the district council of Liesing, June 29, 2015.

Presentation at *Stakeholder forum on participation,* citywide workshop organized by the Smart City Initiative Vienna, May 5, 2015.

Formal and informal power in the planning process. Learning from Årsta. Presentation at Planning for Diversity: a two-day symposium at Experiment Stockholm, at Färgfabriken in Stockholm, February 19–20, 2015.

Presentation to Vienna city officials, Municipal Department for Urban Development and Planning, January 21, 2015.

CASUAL: Co-creating Attractive and Sustainable Urban Areas and Lifestyles. Presentation at 'Europa satsar på forskning – Horizon 2020 och Urban Europe', a seminar organized by IQ Samhällsbyggnad in the Swedish Centre for Innovation and Quality in the Built Environment in Stockholm, January 31, 2014.

Workshop with representatives of Viennese neighbourhood management.

Lecture for students and lecturers of the University of Belgrade, faculty of Geography, visiting Vienna on a study trip on 'Regional and city planning in Central Europe – global, regional and local aspects'.

Papers presented at conferences

REAL CORP 2016, Hamburg, June 22–24, 2016:

Envisioning sustainable lifestyles in Stockholm's urban development. Paper presented by Moa Tunström, Lukas Smas and Liisa Perjo.

Positioning 'Urban Labs' – a new form of 'smart' governance? Paper presented by Lukas Smas, Peter Schmitt, Liisa Perjo and Moa Tunström.

Urban planning through exhibition and experimentation in Stockholm. Paper presented by Peter Schmitt, Lukas Smas, Liisa Perjo and Moa Tunström.

A critical deconstruction of the concept of TOD. Paper presented by Dorina Pojani and Dominic Stead.

Three decades of transport infrastructure development and travel behaviour change in the Netherlands. Paper presented by Dena Kasraian, Kees Maat and Bert van Wee.

Experimenting new forms of urban governance in Vienna. Paper presented by Joanne Tordy, Max Kintisch and Christof Schremmer.

Mobility patterns and lifestyles in Vienna – case study Liesing. Paper presented by Jiannis Kaucic, Stephanie Kirchmayr-Novak, Wolfgang Neugebauer, Joanne Tordy and Christof Schremmer.

AAG Annual Meeting 2016, San Francisco, California, March 29–April 2, 2016:

From a suburban greenfield to an urban park: the case of Årstafältet in Stockholm, Sweden. Paper presented by Moa Tunström, Lukas Smas and Liisa Perjo.

Exhibiting the future of the city: a driver of co-created and creative planning work? Paper presented by Peter Schmitt, Lukas Smas, Liisa Perjo and Moa Tunström.

Neoliberal politics of urban planning practices in state-led property development. Paper presented by Lukas Smas, Peter Schmitt, Liisa Perjo and Moa Tunström.

Deutschen Kongress für Geographie (DKG) 2015, Berlin, October 1–6, 2015:

Ausstellungen zur Zukunft der Stadt – ein vielversprechender Ansatz für eine andere Planung? Paper presented by Peter Schmitt, Lukas Smas, Liisa Perjo and Mitchell Reardon.

AESOP Annual Congress 2015, Prague, July 13–16, 2015:

Lifestyle planning: investigations of the gap between neoliberal urbanism and everyday neighbourhood practices. Paper presented by Lukas Smas, Liisa Perjo and Peter Schmitt.

Exhibiting the futures of the city: a driver for self-organised, participative and co-created planning work? Paper presentation by Peter Schmitt, Lukas Smas, Liisa Perjo and Mitchell Reardon.

Published and submitted papers

Kasraian, Dena, Maat, Kees, Stead, Dominic & van Wee, Bert (2016) Long-term impacts of transport infrastructure networks on land-use change: an international review of empirical studies, *Transport Reviews.* DOI: 10.1080/01441647.2016.1168887

Kasraian, Dena, Maat, Kees, van Wee, Bert (2016) Three decades of transport infrastructure development and travel behaviour change in the Netherlands, *REAL CORP 2016 Proceedings*, Editors: Manfred Schrenk, Vasily V. Popovich, Peter Zeile, Pietro Elisei, Clemens Beyer.

Kaucic, Jiannis, Kirchmayr-Novak, Stephanie, Neugebauer, Wolfgang, Tordy, Joanne, Schremmer, Christof (2016) Mobility patterns and lifestyles in Vienna – case study Liesing, *REAL CORP 2016 Proceedings,* Editors: Manfred Schrenk, Vasily V. Popovich, Peter Zeile, Pietro Elisei, Clemens Beyer.

Pojani, Dorina & Stead, Dominic (2016) A critical deconstruction of the concept of TOD, *REAL CORP 2016 Proceedings*, Editors: Manfred Schrenk, Vasily V. Popovich, Peter Zeile, Pietro Elisei, Clemens Beyer.

Pojani, Dorina & Stead, Dominic (submitted) Past, present, and future of Transit-Oriented Development in European City-Regions.

Schmitt, Peter; Smas, Lukas; Liisa Perjo & Tunström, Moa (2016) Urban planning through exhibition and experimentation in Stockholm, *REAL CORP 2016 Proceedings,* Editors: Manfred Schrenk, Vasily V. Popovich, Peter Zeile, Pietro Elisei, Clemens Beyer.

Smas, Lukas; Schmitt, Peter; Perjo, Liisa & Tunström Moa (2016) Positioning 'Urban Labs' – a new form of 'smart' governance?, *REAL CORP 2016 Proceedings*, Editors: Manfred Schrenk, Vasily V. Popovich, Peter Zeile, Pietro Elisei, Clemens Beyer.

Tordy, Joanne, Kintisch, Max & Schremmer, Christof (2016) Experimenting new forms of urban governance in Vienna, *REAL CORP 2016 Proceedings,* Editors: Manfred Schrenk, Vasily V. Popovich, Peter Zeile, Pietro Elisei, Clemens Beyer.

Tunström, Moa (2016) Envisioning sustainable lifestyles in Stockholm's urban development, *REAL CORP 2016 Proceedings*, Editors: Manfred Schrenk, Vasily V. Popovich, Peter Zeile, Pietro Elisei, Clemens Beyer.

Other

Poster presented at JPI Urban Europe Projects Meeting in Brussels, October 14, 2015.

Poster presented at JPI Urban Europe Projects Meeting II in Amsterdam, April 14, 2015.

Film animation on JPI Urban Europe's YouTube channel presenting the project: https://www.youtube.com/watch?v=eYSEPoxo1jw

Presentation of the project in Nordregio News (4/2015): http://www.nordregio.se/Global/Nordregio%20News/2015/ONLINE_Norderegio%20News_4_2015.pdf

Critical review of urban sustainable policies and assessment, by Christof Schremmer, Stephanie Kirchmayr-Novak, Max Kintisch, Ursula Mollay and Heidi Collon, June 2014, Working paper published on www.oir.at.

Mobility patterns and lifestyles in Vienna, by Christof Schremmer, Jiannis Kaucic, Wolfgang Neugebauer, Stephanie Kirchmayr-Novak, Joanne Tordy, Max Kintisch and Ursula Mollaym, June 2015, Working paper published on www.oir.at.

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CASUAL - Co-creating Attractive and Sustainable Urban Areas and Lifestyles

Exploring new forms of inclusive urban governanceUrban policies and projects that are expected to promote sustainability are often focused on the built environment and the technical infrastructure. Less attention is given to changing lifestyles and everyday practices, even though citizen and consumer behaviour have a tremendous impact on resource consumption in our cities. In the CASUAL project we have investigated sustainable living and consumption patterns by including citizen and consumer perspectives in the governance of urban areas. We have explored new forms of inclusive urban governance by looking at collectively organised initiatives outside formal planning procedures (so-called urban living labs). In addition, planning for sustainable mobility has been investigated through a focus on transit-oriented developments. This is the project's synthesis report.

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