

Integrating User Needs in Sustainable Neighbourhood Transition of the Smart City – Expanding Knowledge and Insight among Professional Stakeholders

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1 ABSTRACT

Climate neutral and social inclusive cities are set high on the European Agenda. The smart city approach is considered to be one measure within socio-technical systems to reach this ambition. In recent years, smart city initiatives were criticised for having fallen short of their objectives to meet user needs and public value creation (Hollands, 2008; Cardullo et al., 2019). Besides accelerating citizen participation activities, we assume that capacity building among professional stakeholders with the help of (social) learning can contribute to the development of more citizen-centred solutions in the built environment. Especially when resources or citizens availabilities are limited, capacity building among professional stakeholders can be an important contribution to get a better understanding and insight of public value creation in the built environment.

In elaboration of this assumption, we set the spotlight on Zero Emission Neighbourhoods (ZEN) as one smart city approach to reach more climate neutral cities through an integrative approach to transform socio-technological systems. We ask how citizen needs could be better integrated in the development of smart city projects within the built environment. In particular, we investigate how professional stakeholders, such as developers, landowners, planners, civil servants can gain more insight and knowledge of citizen needs and values to create solutions that are in line with their demands and thereby foster public value creation in a better way. Building on theoretical concepts for innovation and learning and findings from a case analysis of a Norwegian neighbourhood in transition, we present a concept for a workshop as a tool to detect market preferences through insight in citizen needs. We thereby contribute to elaborate on learning within multi-stakeholder settings and especially capacity building among professional stakeholders. Additionally, we provide practical guidance for using a tool that can be seen as a contribution to approaches towards stakeholder participation as well as for a methodology of local context-based tools for social learning.

Keywords: Zero Emission Neighbourhoods, Social innovation, Sustainable Transition, Multi stakeholder partnerships, User needs

2 INTRODUCTION

2.1 Climate neutrality in the build environment through the development of zero emission neighbourhoods

Developing the built environment of the future that is climate-neutral and at the same time socially inclusive is a major challenge for all actors involved – especially since the challenge is wicked, and situated between different sectors and actors. The aim is to find appropriate solutions within a holistic approach in collaboration between those involved and in all phases of development from the planning, construction and operation phase of the built environment.

The co-creation of solutions becomes even more important when ambitions for neighbourhood development are higher than existing laws and regulations are asking for. Reaching climate neutrality in the built environment is such a vision. Agreed during the UN climate mission in Paris, the participating countries have agreed to lower their carbon footprint towards zero until 2050. While translating these goals into national and municipal policies, some countries, regional or municipalities set their ambition even higher to become carbon neutral in a shorter timeframe. A special focus lies here on the built environment since it is one of the main sources of greenhouse gas emissions and on the energy sector that is to be transformed to renewable energy (Global Alliance for Buildings and Construction, 2019). Additionally, the neighbourhood gets more and more attention as it is identified as a main area to enable change and to realise diverse cross sectoral cutting effects and scale effects (Jank, 2017).

One integrative approach to reach for climate neutrality in the built environment is the concept of Zero Emission Neighbourhoods developed by the Research Centre for Zero Emission Neighbourhoods in Smart

Cities (ZEN Centre). A zero emission neighbourhood aims to reduce its direct and indirect greenhouse gas (GHG) emissions towards zero over its life time. With the help of life cycle assessment in all phases of neighbourhood development – including, planning, implementation and operation – the total number of emissions is assessed. These emissions are compensated through renewable energy production on site during the operation phase of the neighbourhood. The ZEN centre has developed key performance indicators (KPIs) within seven categories: GHG, energy, power, mobility, economy, spatial qualities and innovation, both to assess the status towards carbon neutrality and to help stakeholders to guide them to identify the right solutions (Wiik et al., 2019).

2.2 Co-creation and stakeholder's role in sustainable transition

An open dialogue and interaction of stakeholders involved in zero emission neighbourhood development, will facilitate co-creation of new solutions and innovation, which are needed to meet the challenges of the future and to achieve the sustainability goals that countries, cities and municipalities have committed themselves to. These challenges of the future need to be answered with tools and knowledge from a majority of actors (Schneidewind et al., 2016; Soma et al, 2018).

Nielsen et al. (2019) argue that the often very technical-oriented ambitions of smart city projects in the built environment have led to narrow dialogues which undermine the real power and capacity of stakeholders, including citizens to influence urban-planning outcomes. Fiskaa (2005) believes that neoliberalism in general has strengthened the position of landowners, business interests, and developers, in urban development. The politically driven neoliberal trend in our study country Norway has also given private entrepreneurs a prominent and driving role in urban development, that can create dependency on markets (Falleth et al., 2010).

Simultaneously, economically markets of the built environment are dependent on demand and interest of potential buyers. Smart city projects with high environmental ambitions and technological solutions do challenge stakeholders with the novelty of their concepts and technological solutions. ZEN neighbourhood developments are challenged by uncertainty and perceived risk – both from the stand-point of the citizen as end-users of buildings and infrastructure and of professional stakeholders as developers or land owners.

One approach to obtain a better insight in market preferences and citizen demands is direct participation to develop solutions for neighbourhoods that are in line with citizen demands. At the same time, the facilitation of participation processes is depending on the goal of participation, the degree of appropriate engagement, the stage of the project at which participation occurs, the capacity of stakeholders and the resources available (Raynor et al., 2018). Participation is embedded in a local context and its implementation depends on different factors. An additional approach is capacity building of professional stakeholders to develop deeper insight and understanding in citizens' needs and demands which will enable them to provide solutions closer to citizen needs.

2.3 Outline

This paper looks at how professional stakeholders, such as developers, landowners, planners, civil servants can gain more insight and knowledge of user needs and values to create solutions within neighbourhood developments that are in line with user needs and thereby foster public value creation.

Following the introduction, the paper provides a brief description of relevant theories and concepts in section 3 while section 4 is about the methodology that was adopted in this study. The results of the case study are presented in section 5 which describes the case study of a neighbourhood development in Ydalir, Norway and hence provides the context and need for a tool for capacity building and identification of marked preferences. Based on this analysis, the concept for the tool is developed and presented. Section 6 focuses on analysis and discussion. The concluding section 7 winds up the whole discussion.

3 LEARNING FOR SUSTAINABILITY - RELEVANT THEORIES AND CONCEPTS

In this section, we present relevant theories and concepts that help us to study how professional stakeholders obtain insight and knowledge on user needs and values. In this regard, we look at the following concepts: social innovation, social learning, capacity building, design thinking, and single- and double-loop learning. These concepts are mutually related and overlapping, at least to a certain extent. At the end of this section, we present a figure to illustrate how these concepts are inter-connected.

Social innovations are widely understood as new ideas that aim at meeting social goals (Hellström, 2004). Therefore, the role of social innovations within the development of socio-technological systems as highly ambitious neighbourhoods is to enable improvement of the well-being of citizens and the civil society in general. The involvement of citizens and stakeholders is one crucial element to enable social innovation within the quadruple-helix model (Carayannis et al., 2009), a model of cooperation among stakeholders from the public and private sectors and academia, with a strong emphasis on citizens and their needs. Social innovation within the Nordic model relates to activities that are social and representing both needs and ends, such as collaborations between multiple stakeholders in the community that initiate and drive developments to meet new challenges of the future (Copus, 2017).

Social innovation can be understood as output of social learning processes, which do occur in heterogenous setting of stakeholders with diverse values and conceptional frames, knowledge, interests, and resources (Beers et al., 2016). When these stakeholders share their knowledge in an interactive process – often generated in a workshop setting facilitated by a neutral person – they are likely to produce new knowledge and trust, and this lays the basis for joint action (Pahl-Wostl, 2006). Social learning emphasises the output of learning processes, which, besides joint action, can also result in new skills and capacities. Capacity building is defined as activities that strengthen the abilities, knowledge, skills and behaviour of individuals (individual capacity building) or organisations (organisational capacity building) (Ku et al, 2013; Farazmand, 2004). Capacity building is thereby understood as both a process for improving the capacities of individuals and, at the same time, as an outcome of that process (Jensen, 2017). In relation to citizen participation, capacity building is understood as either local government institutions aiming to enable citizens to participate or to build up human capital in the form of skills, experiences, and knowledge (Pretty, 1999; Jackson, 2001).

Design thinking as a process, is a user-centred approach to address wicked problems through collaborative problem-solving and ideation of diverse stakeholders (Brown and Wyatt 2010). Through an iterative process and a set of different methodologies, participants are designing products or services in this process that improve user experience and enhance public value (Mintrom, Luetjens, 2016). Enabling to understand the perspective of others, design thinking facilitates greater empathy and entails understanding different perspectives, cultures and contexts that will inspire a holistic solution. Design thinking can thereby help to promote and design solutions and systems that are more responsive to citizen needs (Raynor et al., 2018). Design thinking consists of four key characteristics. These are: (1) placing humans and their needs at the heart of the enquiry; (2) embracing optimism, openness, non-linearity, complexity, ambiguity and uncertainty; (3) adopting fast iterative and experimental processes through a variety of design methods and hands-on tools, and (4) using tangible, accessible and collaborative methods of communication to share with stakeholders throughout the project's development (Raynor et al., 2018).

Within social learning setting, the concept of single and double loop learning, which was originally drafted within organisational learning, focuses also on the ability to change existing values and conceptional frames and thereby also open up more radical innovations. Argyris and Schön (1996), who developed this concept, discuss about learning as understanding and eliminating the gap between the expected result and the actual result of an action. The gap between the expected results and actual results can be eliminated by either making changes or taking corrective measures within the existing values and norms (by changing strategies of action or underlying assumptions of the strategies that are within the values and norms) – that is, single-loop learning, or by changing the existing values and norms – that is, double-loop learning. While the single-loop learning focuses on doing things right within the realm of the existing norms and values, double-loop learning focuses on doing things right according to the nature of the circumstances and changing conditions and thereby enabling for more open and integrative innovation processes. Connection between the relevant concepts that we have presented above can be seen in several ways. One of the ways to look at the connection is illustrated in the following figure:

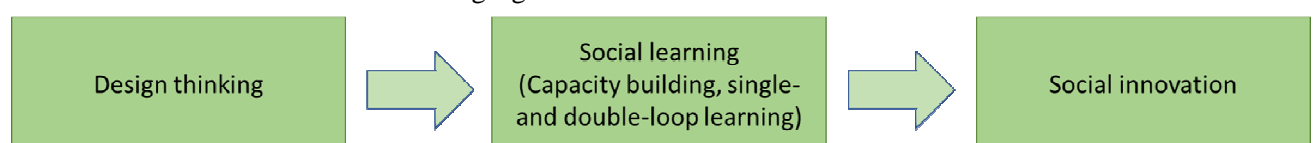


Fig. 1: Connection between the relevant concepts on innovation and learning

As Figure 1 shows that design thinking can be seen as an overall approach that could guide to develop and conduct learning and capacity building processes, which in turn could lead to social innovation. This linear connection of the concepts functions as a kind of a theoretical framework for this paper.

4 METHODOLOGY

Our methodological approach is threefold: Firstly, we studied literature on concept and theories for learning in sustainable transition to develop our methodological framework for this study. Secondly, we conducted a case study for the neighbourhood of Ydalir in Elverum (Norway), aligned with 8 qualitative interviews with involved stakeholders, to identify challenges as well as needs and knowledge demands towards markets preferences. Ydalir is a demonstration site within the ZEN Centre. Thirdly, based on the results of the first two steps we developed a tool for capacity building among professional stakeholders to enable them to come up with social innovation in sustainable neighbourhood development and transition.

5 RESULTS OF THE CASE STUDY

5.1 Background information

The neighbourhood of Ydalir is a new development on a former sand quarry, located in the mid-size town Elverum in County Hedmark in Norway. It has a size of approx. 330 000 m², and it is located 1.5 km from the town centre. The estimated timeframe for completion is 2035 and 800 to 1 000 residential units are planned (approx. 100,000 m²). The residential units are planned as a combination of detached houses and apartment buildings, and will be built around a school and a kindergarten, which were completed and opened in autumn 2019.

The main stakeholder is the project owner Elverum Vekst. Elverum Vekst (EV) is fully owned by Elverum municipality and aims to promote growth in both population and businesses. Operational activities related to area development and sale of plots are carried out through the subsidiary land development agency Elverum Tomteselskap (ETS). At the beginning of the development in 2015, 80% of the land in Ydalir was owned by the land development agency. Since then, two plots were already sold to local housing developers. Two private landowners count for the remaining 20% of the area. Other stakeholders involved are Elverum municipality, several local private developers who have signed intention agreements with ETS, consultant agencies, the local transportation agency, the local energy utility company that will deliver district heating and grid connection, and the local waste management company.

From 2016 to 2018, a masterplan for Ydalir was developed in a collaborative process facilitated by the project owner. Five workshops over a period of six months were dedicated to different aspects of the project development. These included topics such as aims and vision, energy, building and infrastructure, user and quality aspects, and transportation. The project owner, ETS, invited deliberately a wider group of participants to the five workshops, in order to integrate as many stakeholders as possible in the masterplan development and create knowledge and commitment for further development. The result of this process is the masterplan, which aims to ensure the realisation of basic qualities within the areas of urban design, energy and material use, blue green infrastructures and waste management, while also being flexible enough to accommodate individual solutions provided by the developer. The ambition for Ydalir is to become a zero emission neighbourhood. To reach this ambition, the masterplan consists of measures to follow in different areas, from local energy production to use of material with low embodied emissions, and measures to reduce mobility demand and strengthening the design of attractive public spaces.

At the beginning of the planning phase, a branding strategy was developed for Ydalir in 2016 to address potential buyers. A workshop was conducted with participants from ETS, local politicians, members of the administration of the municipality, and representatives for the focused inhabitant groups of Ydalir (families and young persons). The aim was to identify needs and values of the potential inhabitants regarding the neighbourhood development. Representatives from different potential user groups participated in the workshop: citizens who have just moved to Elverum, former citizens of Elverum who are living out of town and are considering moving back, as well as older residents living in Elverum.

5.2 Actual situation and need for deeper insight in market preferences

Stakeholders involved in Ydalir had expressed in former studies lack of knowledge in different thematic areas and a need for knowledge development and capacity building in them. Areas that were pointed out are knowledge on implementation of building solutions that go beyond existing building standard TEK 17, holistic and integrative project management for the whole neighbourhood development, system definition and geographical size of the ZEN neighbourhood (Baer, 2018). Uncertainty about the demand for residential units in Ydalir was already expressed at the beginning of the project in 2017, due to the stagnating population development in the city of Elverum. This perceived risk got more attention in a later phase of development, when the first developers begun to regulate their sites and started to sell the plots to future inhabitants of Ydalir. Initially, the landowners and developers considered the limited parking spaces per unit in line with high environmental ambitions as a challenge to sell the plots. Due to the influence of housing developers and landowners, the masterplan of Ydalir was reviewed and the parking regulations were watered down so that the number of parking spaces per unit was increased in 2019. The professional stakeholders expressed their interest and need to intensify joint marketing activities and develop better insight in market preferences and knowledge on "what sells" to include in the narrative of the marketing content for a ZEN area.

In September 2020, the land development agency initiated a first meeting with the developers who had bought properties in Ydalir or signed intention agreements to get feedback on the idea of joint marketing activities. The meeting was held in the school of Ydalir, one of the first buildings in Ydalir, which was built to share rooms and facilities with the neighbourhood and to function as a neighbourhood centre. Professional stakeholders showed interest in gaining deeper insight in the content of marketing activities of ZEN areas and to intensify collaboration on joint marketing activities.

Citizen participation was mainly facilitated by following the plan and buildings law for public consultation of respective planning documents. From the project owner's and the developer's sides, citizens are mainly addressed as consumers, buyers and potential clients. Direct involvement in form of participation of representatives for potential client groups took place at a workshop for the branding strategy of Ydalir in 2017. Stakeholders involved describe the process so far as a confined culture for direct citizen participation.

To sum up, the professional stakeholders, mainly developers and land owners, perceived the risk that the development of a ZEN neighbourhood following higher environmental regulations was not in line with market preferences. Furthermore, there was perceived uncertainty among these groups about what a ZEN neighbourhood offers the market and why it is attractive for citizens to buy a house in Ydalir. The capacities and resources available in the demonstration site were geared towards building on the expressed need to get deeper insights in market preferences and appropriate marketing approaches of a ZEN area. At the stage when the project development of Ydalir was on the tipping point between the planning and the design phase and the first buildings were completed, stakeholders involved expressed a need for an "easy to handle" approach/tool to elaborate marketing activities. The goal of this tool was to cope with perceived risk and uncertainty through capacity building and deeper insight in market preferences and needs and how ZEN solutions could satisfy them.

5.3 Concept for a market preference tool

Building on the literature review of diverse approaches towards learning and knowledge development in transforming the built environment into a more sustainable one, as well as on the need analysis of the case study of Ydalir, we drew up a concept for a workshop design that focused on working with market preferences. We call it the Market Preference Tool (MPT), presented in figure 2.

The Market Preference Tool's main element is a workshop, which is aligned with a preparation and follow-up phase. We present the tool and the learning concept of the workshop in a chronological order. After a short introduction of the tool in its specific section of preparation, workshop and follow-up, we present how the tool was tested in the case of the neighbourhood of Ydalir in Elverum, Norway.

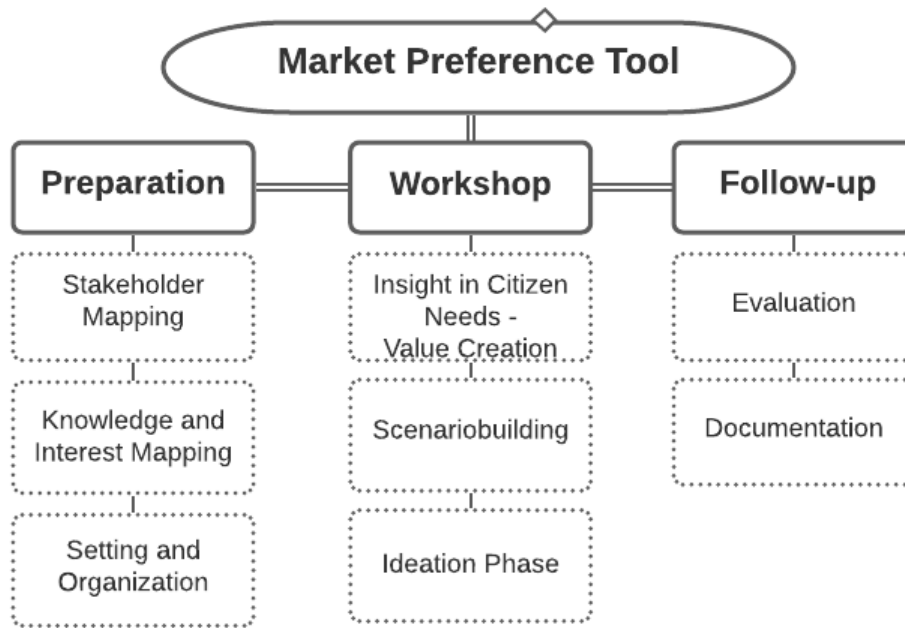


Fig. 2: The MPT tool

5.3.1 Preparation

If not done earlier in the projects timeline, a systematic review of stakeholders through stakeholder analysis is an important first step to identify which stakeholders to invite to the workshop and their status of knowledge. Stakeholder analysis consists therefore of a mapping of stakeholder and their knowledge and interests. In preparation of the workshop and its elements, the stakeholder analysis should include a short description of knowledge and interests of the respective stakeholders. The identified status of knowledge and interest is guiding the need of knowledge to be presented at the workshop.

As the Ydalir project is spanning over several years and new stakeholders or different persons are representing organisations, preparation is an important step in a project with a long timeline for completion. Based on stakeholder mapping, relevant stakeholders were identified and sorted by their relevance to the specific topic of the workshop. Relevant stakeholder groups (six groups) were identified, and they attended the workshop in different numbers: landowners/developers (6), (municipal) administration and project development (7), architects (2), energy sector (2), marketing (2) and complementary financial sector (1). In total 20 participants attended the workshop in addition to five researchers.

The mapping of stakeholders is accompanied by a mapping of existing knowledge of the stakeholders on the project development itself, its history and concepts relevant for the workshop topic. In the case of Ydalir, this mapping was done by the project owner. As relevant knowledge inputs, the status of the neighbourhood development of Ydalir and the results of a former workshop from 2017 on branding were identified. These both were presented by the project owner at the workshop. Additionally, new knowledge inputs as co-benefits of integrative neighbourhood development or best practices for city- and neighbourhood marketing activities were presented by external actors to provide workshop participants a deeper insight in these topics and concepts to enable them to ideate within new knowledge frames.

5.3.2 Workshop

The workshop itself builds on three elements: Firstly, to get insight in citizens’ needs, secondly to develop a joint idea of the future neighbourhood in line with citizen needs, and thirdly to ideate concrete action points on further process and marketing activities. Tab. 1 presents the knowledge input from external or internal sides of the project stakeholders involved and the techniques used for learnings and knowledge production during the workshop.

Workshop phases/ Knowledge development	1. Insight in citizen needs	2. Scenariobuilding: Define solutions and benefits of future neighbourhood	3. Ideation Phase
Knowledge input – extern: from the external actors	Elements of wellbeing concept, double-loop learning concept, co-benefits	--	Best practice for city and neighbourhood marketing activities
Knowledge input – intern: from the internal actors	--	Status of Ydalir development, Masterplan of Ydalir, former work on branding and marketing	--
Techniques to gain new knowledge and experience	Role cause analysis/ 5 whys technique, role changing	Scenario-building, role play: tell a friend, double- loop learning	Brainstorming, visualisation, pitching

Table 1: Workshop phases

During the first part of the workshop - insight in citizen needs - we started with a role-change, where participants change role from being a professional person to a private person, and describe elements they like about their home, neighbourhood and city. Building on the descriptions of this "elements of wellbeing", the participants worked with a root cause analysis facilitated by the 5 whys technique to identify needs and values. This task laid the basis for double-loop learning activities facilitated in the second part of the workshop. Additionally, the participants were introduced to the concepts of double-loop learning, elements of wellbeing and co-benefits especially related to technical solutions to give them deeper background insight and enable them to adopt these learning when creating future scenarios of Ydalir in part two.

The second part of the workshop was dedicated to develop a vision of the future neighbourhood of Ydalir in 2030. The starting points were the seven categories of the ZEN neighbourhood definition (see 2.1), and a best-case scenario for Ydalir in 2030 was developed in groupwork in four groups. Each group consisted of participants from the six different stakeholder groups (see 5.3.1) to enable for social learning across sectors and disciplines. The results of the group work were presented in a role play, facilitated as "tell a friend" play, where the participants had to convince a friend to move to Ydalir in the year 2030. Due to covid 19 restrictions, we had to stick to the groups and could not form new groups during the workshop, which would enable for more learning activities a cross the groups and its participants.

While the first two parts of the workshop were dedicated to develop a deeper understanding of citizen needs and values and how a zero emission neighbourhood could respond to them, the last part was dedicated to describe the way forward, the process ahead and marketing activities to be implemented to gain more interest of potential buyers. The workshop itself should ideally be facilitated by a neutral person – in our case the researchers of the ZEN Centre facilitated the workshop. All group and individual work was done with tactile and artistic elements as visualisation on post-its and sheets or role play to facilitate learning.

5.3.3 Follow-up

After the workshop, two elements are important to conduct. An evaluation of the workshop itself to gain insight and feedback on results and effectiveness, potentially missing points and to catch up ideas and thoughts that have been developed by the participants after the workshop. A proper documentation of results and a summary of key results need to be shared with workshop participants and ideally must also be communicated to stakeholders that did not participate in the workshop and to the local community.

In the Ydalir case, we conducted an evaluation of the workshop with help of a web-based questionnaire. The questionnaire had an open research design with qualitative questions regarding the learning and knowledge development of the participants, the workshop design and its organizational implementation. Ten participants (50% of total number) from all stakeholder groups responded to the questionnaire. The answers of the participants shows that the intended knowledge development and learning arose. Participants emphasized that they got new knowledge on the Ydalir project and inspiration from new concepts and best-practice projects. Insight in other participants and citizens mindset and interests, was realised during the workshop as expressed by one participant who represented developers: "Learned a lot about marketing and how those who work with it think". Double-loop learning happened as participants started to reflect on own attitudes and perceptions, as a participant from administrative side expressed: "For me, as I come from marketing, it

was completely new knowledge that in such [neighbourhood development] projects it is everyone and not just a specific focus group - and this was completely new to me."

6 ANALYSIS AND DISCUSSION

As we have seen earlier, the MPT tool has 3 elements, namely preparation, workshop, and follow-up. The focus of this paper is on the main element: Workshop.

During the first part of the workshop – where the participants changed their roles from a professional person to a private person, and described elements they like about their home, neighbourhood and city – the participants could get the opportunity to reflect and learn. When they tried to describe likable aspects of their home, city, etc., they could then structure and formulate the likable aspects. Structuring and formulating thoughts, which are often abstract, is itself a learning process, and it can lead to obtain new understanding or perspective.

During the second part, there were, among other things, groupwork and role play. Groupwork that consisted of participants from diverse branches and backgrounds was aimed at facilitating collective reflection and discussion, and hence creating new knowledge and understanding. In other words, social learning took place through interaction with other participants in the workshop. Knowledge is continuously reproduced and potentially transformed during interaction between people (Stacey, 2001). The way people interact – communicate, respond and discuss – with each other plays a key role in creating new knowledge.

This new knowledge could enable the participants to capture a holistic understanding of the discussed matter, think out-of-the-box- and trigger double-loop learning. Varying views expressed in the groupwork and discussions during the role play (convincing a friend to buy a house) could challenge the participants' pre-established understanding and norms, and lead the participants to reflect on questions such as "why do we do what we do?" and "why do we do it the way we do?" These questions can facilitate critical reflection on the existing values and norms, and hence promote double-loop learning. Asking the fundamental and critical questions can be seen in connection with a description that Schön (1998) mentions regarding reflection of a practitioner: "A practitioner's reflection can serve as a corrective to over-learning. Through reflection, he can surface and criticise the tacit understandings that have grown up around the repetitive experiences of specialised practice and can make new sense of the situation of uncertainty or uniqueness which he may allow himself to experience" (Schön, 1998, p. 61). The description points out the importance of being exposed to diverse views and critical reflection in finding new ways to approach and tackle the situation at hand.

From the Ydalir case, we found out that the intended learning is created with the help of the MPT tool. The learning that happened in the workshop is an important part and ingredient of capacity building, which could lead to innovation. This learning can be viewed in connection with three learning traditions that can be applied to collaborative work settings to accomplish a task related to sustainability transitions. The three learning traditions are: Collaborative, organizational and social learning in natural resource management (Mierlo and Beers, 2020).

When discussing collaborative learning, Mierlo and Beers (2020) say that interaction in heterogeneous groups – compared with interaction in homogeneous group – can lead group members to develop more understanding, knowledge, and competence. Different views and understanding that emerge from a heterogeneous collaborative setting can direct group members to reflect upon their own understanding of the reality from different (others') perspectives, develop a holistic picture of the situation and thus make sense of the situation. Application of the MPT tool – especially, the workshop – demonstrates this point. When it comes to organizational learning, the authors discuss the role of single- and double-loop learning in changing practices in organizations. New understanding that arose from communication, reflection and interaction in the workshop suggests that the workshop is conducive to single- and double-loop learning. When describing social learning in natural resource management, the authors point out that "the literature typically views social learning in terms of its inputs and outcomes, with stakeholder diversity (knowledge, interests, values, resources) as input and novel solutions to complex social problems as outcomes" (Mierlo and Beers, 2020, page 262). Diversity of the participants in the workshop (see 5.3.1) and the statements from the participants (see 5.3.3) depict the relevance of social learning. In our view, these three learning traditions seem to overlap each other, at least to some extent.

Mierlo and Beers (2020) also differentiate two major modes of learning in transitions:

- Discursive interaction: This is mainly about exchanging information, knowledge and meanings, and creating a common ground for understanding.
- Reflective action: This primarily deals with searching for viable and applicable solutions, and engaging in an iterative process of action and reflection that involves activities of planning, action and evaluation that can lead to change practices.

According to the authors, discursive interaction is a part of reflective action. The workshop encompasses these two modes of learning in transitions. When it comes to reflective action, it is to be noted that the last part of the workshop was dedicated to describe the way forward, the process ahead and marketing activities to be implemented to gain more interest of potential buyers.

7 CONCLUSION

This paper looks at how professional stakeholders such as developers, landowners, planners, civil servants can gain more insight and knowledge on user needs and values to create solutions within neighbourhood developments that are in line with user needs and thereby foster public value creation. In this regard, application of a tool (the MPT tool) in a case project was presented and discussed with using relevant concepts.

Building on literature study on (social) learning and findings from a case study of a ZEN neighbourhood, we presented a concept for a workshop as a tool to get deeper insight in citizens' needs and how professional stakeholders of a ZEN neighbourhood could respond to those needs. This tool has to be seen as one tool among others and the results should be verified by citizens. This tool is not replacing citizen participation.

This paper aimed at contributing to elaborate on learning within multi-stakeholder settings and focused especially on capacity building among professional stakeholders. Additionally, we provide practical guidance for using a tool that can be seen as a contribution to approaches towards stakeholder participation and for a methodology of local context-based tools for social learning.

Poeck et al. (2020) point out that empirical research on learning in transition initiatives is rare. This paper and the study associated with it can be considered as a contribution to this research field.

About further research:

- As this workshop was facilitated by researchers, we will discuss the setting and factors necessary to implement this workshop by diverse stakeholders in detail at a later point of time.
- The presented study is embedded in an ongoing research project on market preferences for Zero Emission Neighbourhoods. Results from other future workshops (applying the MPT tool) will be studied to find out more about the application of the MPT tool and its effects in diverse settings.

8 ACKNOWLEDGEMENTS

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