Maren Wesselow, Torsten Grothmann, Bernd Siebenhüner,
Ulrich Scheele, Ernst Schäfer

6 The Role of Citizen Participation in Developing a New Energetically Efficient Quarter – Limitations and Success Factors

Summary: Citizen participation is vital in the design and implementation of new technologies. In the ENaQ project, a long-term participatory process is applied to accompany the development of a new energetically efficient residential quarter in the city of Oldenburg. This chapter shows how different participatory formats were used to involve the public at different stages of the project. We shed light on limitations to citizen participation in the context of technological developments in the housing sector including the fact that future residents are not known, the highly technical topics, limitations set by external framework conditions, conflicting interests and contact restrictions due to the Covid-19 pandemic. To share our learnings with similar projects, we examine how these hurdles can be overcome, and identify the following success factors supporting effective participatory processes: (1) thorough participation in an early stage, (2) the presence of planners and decision-makers at participation processes, (3) combining technological and social benefits, and (4) the institutionalisation of participation.

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Maren Wesselow, Torsten Grothmann, Bernd Siebenhüner, Ecological Economics, Faculty II, Carl von Ossietzky University of Oldenburg, Ammerländer Heerstrasse 114–118, 26129 Oldenburg, Germany
Ulrich Scheele, Ernst Schäfer, The Regional Planning and Environmental Research Group (ARSU)

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6.1 Citizen Participation in the Context of Technological Development in the Housing Sector

In the context of climate change mitigation, energy efficiency in the housing sector has gained urgency in the last years. Combined with growing demand and increasing property prices as it is the case in Germany, housing and building represent highly debated and emotionally charged topics for many people. High expectations are tied to new technologies as facilitators for an energy transition in the housing sector. In this context, the concept of "Smart Cities" bears potential to contribute to higher energy-efficiency in the housing sector and thus has attracted considerable attention in the context of urban development policies (Moser/Wendel/Carabias-Hütter 2014, Hollands 2015). The concept refers to the strategic approach to the sustainable development of cities that aims at high living standards through an efficient management of natural resources, citizen participation and involvement through the use of ICT (Gagliardi/Schina/Sarcinella 2017). Smart Cities come with both technological and societal developments that are closely intertwined (Schaffers/Komminos/Pallot et al. 2011, Baltac 2019). Besides potential advantages such as more efficiency, better access to information and direct governance possibilities (Lee/Lee/Phaal 2013), some scholars criticise the potential of adverse effects of ICTs such as rebound effects (Viitanen/Kingston 2014), a strong focus on business oriented urban development (De Jong/Joss/Schraven 2015) and the neglect of questions of wellbeing and social justice (Hollands 2008). These risks underline how important it is that technological innovations should be based on the actual needs of the users and should not generate any further needs and should not be developed as an end in themselves. Moreover, it must be kept in mind that despite their focus on digital solutions, smart cities represent physical social spaces with a high potential for direct and not only virtual social interaction (De Jong/Joss/Schraven 2015). Technological innovations, especially in the field of housing, are therefore inseparably linked to social questions of equality, health and the quality of life calling for complementary institutional arrangements such as legal rules and standards (Weiss/Eikemo 2017, Grossmann 2019).

In view of this complementarity of human-technology systems, the inclusion of societal actors is seen as crucial for smart city projects (Gagliardi/Schina/Sarcinella 2017). One form of including societal actors is citizen participation. Citizen participtionn can be defined as "the practice of consulting and involving members of the public in the agenda-setting, decision-making, and policy-forming activities of the organization or institutions responsible for such functions" (Rowe/Marsh/Frewer 2004, p. 89). In the ENaQ project, our approach to citizen participation goes beyond traditional "one-way" education and outreach efforts and involves "two-way" interaction with citizens (Powell/Colin 2009) reaching different intensities from information to co-production (Brandt/Schmeling/AlcortadeBronstein et al. 2021):

- Information: One-way communication by offering information to participants, with only little opportunity for participants to comment and contribute to the discussion
- Consultation: One-way communication by questioning the participants, contributions are integrated in the decision-making process
- Co-Creation: Participants are offered specific opportunities for planning and designing solutions and results, the decision-making process lies with the organisers and initiators of such processes
- Co-Production: Participants are involved in decision-making, implementation and possibly the operation of solutions or they organise and initiate the realisation themselves

Many scholars have investigated both institutional frameworks and design principles that facilitate participatory processes. Knipp/Linder/Haubner 2020 (pp.28–29) identified the following success factors of participation processes in the context of municipal sustainability management: early information on the goals and content of the plan, methods to actively approach people, local presence and openness to citizens' ideas, a consistent and clear presentation of the framework conditions, and the willingness to compromises and room for manoeuvre. In addtition, the continued participation at least until the realisation of the project, working with multipliers to reach diverse target groups, and an "enabling" attitude on the part of the administration are quoted by the authors as success factors for participatory processes (Knipp/Linder/Haubner 2020).

As additional determinants of effective participation, Yang/Pandey (2011) identified elected official support and transformational leadership, whereas red tape and hierarchical authority are found to be major hurdles for effective participation. In the context of technological innovation, a further challenge arises from the fact that specific knowledge is required to take sound and responsible decisions on technological innovations such as ICT and energy systems. That is why processes of public participation in transdisciplinary research often tend to be restricted to particular questions, posed at particular stages in the cycle of research, development and exploitation of new technologies, and neglect the deeper questions about values, visions and vested interests that motivate scientific endeavour (Wilsdon/Willis 2004). In particular, the use of participation in later stages of the technological development bears the risk of an instrumental use as "technologies of legitimation" (Harrison/Mort 1998, p. 61 ff.). Yang/Pandey (2011) highlight the complex relationships between success factors for participation outcomes. They found that success factors may be not equally important, they may affect each other, and they may not influence outcomes in a direct way (Yang/Pandey 2011).

Based on these insights, we seek to analyse the experiences with citizen participation in the development of a new smart quarter in the city of Oldenburg. This chapter thus asks which forms and processes of participation took place in the ENaQ project and which success factors or hindrances could be identified. After presenting the

long-term participatory process in sub-chapter 6.2, we identify limitations to and success factors for achieving the participation goals (sub-chapter 6.3). In our conclusions we develop recommendations for practitioners and scholars to design effective participatory formats in urban development and technological innovation processes.

6.2 Participatory Development of the Fliegerhorst Area and Helleheide Quarter in Oldenburg

In this chapter we present the long-term participatory process that was conducted to develop a former military air base (the "Fliegerhorst Oldenburg"). The process started in 2015 and is still on-going. It can be divided into three phases (see Table 6.1).

6.2.1 Early Citizen and Stakeholder Participation

Due to its former use as a military air base, the Fliegerhorst area was not accessible to the public for a long time. After the end of its military use, various suggestions for subsequent use were under discussion until the municipality took the decision to involve citizens in the planning and the subsequent development of the area. The involvement of citizens in the development of the Fliegerhorst area started in 2015, three years be-

Table 6.1: Phases of citizen participation in the Fliegerhorst development.

Phase and Intention	Formats	Topics
2015–2016: **Early citizen and stakeholder participation** Engagement of citizens and representatives of different interest groups to design guiding principles and masterplan	– Bike and walking tours on the area – Exhibition on the history of the "Fliegerhorst" area – Idea cards sent to random citizens – "Stadtwerkstatt" (City Workshop) – "Innovation camps"	General values, wishes, preferences first spatial divisions
Since 2018: **ENaQ project: Opening participation processes on specific topics**	– Public events for information, discussion and co-design, e.g. Dialogue forum, Dialogue Days, summer festival	Specific topics: energy system, mobility, ICT
Since 2020: **Institutionalisation of citizen participation** forming a stable group of interested dwellers to meet on regular basis	– Citizen Workshop" on monthly basis, using interactive methods and materials	Neighbourhood and community areas, green areas

fore the ENaQ project. This initial participatory process was co-funded by the German Federal Ministry for Education and Research and the Ministry for the Environment, Nature Conservation, Building and Nuclear Safety and coordinated by the municipality of Oldenburg. The addressees of the participation process were selected stakeholder groups such as local firms and citizens of the city of Oldenburg with different social groups (especially young and low-income groups) to be involved. To raise public attention, the municipal city planners opened up an exhibition in the former guard building of the air base, where interested citizens could inform themselves about the history of the military use of the Fliegerhorst. They also organised public bike tours across the Fliegerhorst area starting in April 2015. In the first bike tour, together with the mayor, 700 residents of Oldenburg took part (Stadt Oldenburg 2015, p. 4). In addition, the planning bureau of the city of Oldenburg sent out 1200 so-called idea cards to a randomly selected sample of citizens asking for their ideas and suggestions on how the area should be developed. 450 cards arrived back at the municipality containing approximately 1300 suggestions (Stadt Oldenburg 2015, p. 329). The responses indicated which topics were important to the citizens –predominantly mentioned were cross-generational, socially mixed, intercultural and inclusive forms of housing. People also called for have opportunities to meet and voiced the desire to design a "green quarter" with opportunities for recreation, sport, playgrounds and nature conservation (Stadt Oldenburg 2015, p. 32). To discuss the development with a higher intensity of participation, a participatory event called "City Workshop" ("Stadtwerkstatt") was organised in June 2015 (Stadt Oldenburg 2015, p. 54 ff.).

In order to address the topics from different perspectives, three different groups of actors were involved: (1) pupils as the generation of potential future users; (2) representatives of more than thirty organisations and interest groups as well as experts, who provided perspectives and expertise from various professional background; (3) randomly selected and invited citizens (Stadt Oldenburg 2015, p. 57).

As a result, ten guiding principles for the development of the area were developed together with the participants. These guiding principles included "diversity in social structure and building culture", "resilient and sustainable quarter", "human-centred approach to mobility" among others. Furthermore, the resulting documentation also mentions the idea of a decentralized energy supply from renewable energy sources (Stadt Oldenburg 2015, p. 51). The organising institute described this participatory process as open and focussed on the development of a new future-oriented residential quarter.

In the next step, the municipality of Oldenburg sought to develop a first masterplan for the area. A professional planning office was hired to lead this process and develop a masterplan in a participatory manner. This plan should implement the general principles and it should detail the spatial division and land uses. In November 2015 and February 2016, two consecutive "Innovation Camps" took place. Based on different model plans, citizens were invited to collaborate on specific topics of the final masterplan. In these events, participants discussed topics such as mobility, water management, energy,

sustainability and community life. Half a year later in August 2016, the City Council of Oldenburg unanimously adopted the final version of the masterplan as a basis for the further development of the quarter. It included the goal that the new quarter should be carbon-neutral and that an experimental "Smart City Lab" should be developed in the area (Stadt Oldenburg 2016, p. 79).

6.2.2 The EnaQ Project: Designing Topic-Specific Participation Processes

Simultaneously to the participatory process to develop the masterplan of the "Fliegerhorst", the municipality of Oldenburg commissioned the development of a smart city strategy. Since the beginning of 2016, this strategy was systematically developed in cooperation with relevant administrative units and regional businesses as well as scientific institutions (Damm/Lehnhoff/ Masurkewitz-Möller et al. 2017).

Following a call by the Federal Ministries for the Economy (BMWi) and for Education and Research (BMBF) in 2017, a consortium of 21 local organisations from public administration, science and the private sector came together to prepare a common project proposal following up to both developments, the masterplan and the smart city strategy. The respective funding call on "Solar construction/Energy efficient City" specified the thematic focus on promoting energy efficiency in the building sector. After the successful application phase, the research and development project "ENaQ" (Energetic neighbourhood quarter) was launched. The project pursued the objective to develop an energy-efficient and smart energy system in one sub-part of the Fliegerhorst, with a digital service platform for intelligent load and procurement management in its centre. While the masterplan referred to an area of 190 ha, the ENaQ project and its following activities only addressed a relatively small sub-area of the Fliegerhorst (3,9 ha). This sub-area comprises 240 residential units with 25% of the units as rental apartments for single households (students), 25% as rental apartments within a social housing framework, and 50% of the apartments being sold on the real estate market.

To design and implement technologies that are tailored to human needs, citizen participation played a crucial role for the ENaQ project. Besides the development of energy technologies and the establishment of a supporting digital infrastructure, citizen participation forms one of the three pillars of the project. In the beginning of the ENaQ project in 2018, the project partners developed a comprehensive participation concept with the following goals for the participation process (Blum/Brendel/AlcortadeBronstein et al. 2019):

- researching and collecting the wishes, ideas, needs and ideas of the citizens,
- meeting diverse needs and preferences (citizens, administration, experts),
- establishing a political culture of citizen participation,
- providing opportunities for citizens to actively influence the development,

– creating acceptance/legitimacy for the further planning process, and
– advertising for the air base as a future-oriented living quarter.

These motivations epitomise a mixed approach, including normative, substantive and instrumental rationales (Fiorino 1989). The concept detailed the following main topics for the participation: (1) energy trading, digital services, incentivisation, business models, (2) energy cooperatives, (3) the community portal and (4) mobility (Blum/Brendel/AlcortadeBronstein et al. 2019, p. 29). This focus shows a strong emphasis on technological (IT and energy) questions. In the course of the project, diverse formats for participation and information have been implemented to address these topics. For example, in the "Dialogforum Fliegerhorst" in the year 2019 most of these topics were addressed and discussed with citizens. However, due to the the COVID-19 pandemic, they could not be further deepened in participation formats in the following years. While the predominant topics in the beginning ranged around the energy system and IT innovations, less technical topics such as neighbourhood development and the design of green areas entered the agenda in later stages. The topic of water management and climate change adaptation is part of the planning, but the responsible water supply and wastewater disposal company decided against participating as a project partner.

In the summer of 2019, the municipality of Oldenburg and the city's housing association "GSG" organised an idea competition to find a suitable name for the smart city quarter. Over 60 name suggestions were received, and the name "Quartier Helleheide" was chosen by a jury.

In September 2019, the large public event "Dialogforum Fliegerhorst" took place in Oldenburg with workshops on energy and mobility, complemented by a "fair of possibilities". While this event was a joint activity of the project consortium offering a high participation intensity, single project partners launched series of events with more informational character and different target groups. Moreover, project members developed and invited participants to a board game called "Changing the Game – Neighbourhood" (Lanezki/Siemer/Wehkamp 2020). Within this game, the players take on the role of project managers who can design a neighbourhood according to their own standards. Using various materials, the players can build up their neighbourhood in order to achieve the climate goals.

When the Covid-19 pandemic commanded contact restrictions in 2020, participatory methods had to be reduced to online formats such as surveys and online workshops. Nevertheless, so-called "Dialogue Days" could be organised by the project consortium in 2020. They included a series of events such as an online-broadcast discussion round on what good neighbourhoods look like. In addition, walking tours in the quarter (with 150 participants in total), as well as a public board gaming session were organised. Additional formats included online events prepared by students from the University of Oldenburg who developed and organised specific complementary participatory formats on the topics "sustainable mobility" and the development of an

"Energy Signal Light" (Brandt/Schmeling/AlcortadeBronstein et al. 2021, Klement/Brandt/Schmeling 2022). Moreover, a three-day workshop on long-term consolidation of community structures in sustainable residential quarters was held at a students' conference in June 2021.

Since a large range of stakeholders formed part of the project consortium, it is important to mention that internal participation among project partners played an important role within the ENaQ project, for example on the development of novel business models and an energy cooperative.

Despite the ongoing contact restrictions, a summer festival was hosted on the Helleheide area in August 2021 to raise public attention. The two-day event included different thematic tents with project partners presenting their own innovations and demonstrators (e.g. hydrogen car). One booth invited citizens to model future climate neutral cities by using Lego bricks. The entire event attracted about 150 participants. Yet, it can be assumed that the pandemic situation and the hygiene regulations have prevented some interested actors from active participation.

6.2.3 Institutionalisation of Citizen Participation

The participatory formats were covered in social and public media channels and received a high level of public interest in the city. At the time, more and more people approached the project consortium with the interest to purchase or rent apartments in the Helleheide quarter. In response, the housing company brought together a stable group of participants and one facilitating project partner in 2020 in novel and more continuous participatory format. The "Citizen Workshop" ("Bürger*innen-Werkstatt") convened on a monthly basis to discuss concrete questions concerning the future neighbourhood. The mailing list is open to any citizen with interest in the project and more than 90 people have registered. However, only about 20 people (most of them with interest in living in the area) regularly participated in the meetings. In the early phase of the format, discussions revolved around the planning and design of the buildings, so that suggestions could be included in the actual plans. Further topics were public spaces surrounding the houses, mobility and communication in the neighbourhood as well as creating a vivid community life. In this format, varying experts from different thematic areas addressed by the project, such as architects or engineers were present to explain the actual state of planning or the functioning of a certain technology. This also ensured that the citizens' opinions were included into further planning and decision making. However, this format had to be shifted to a digital version when contact restrictions were put in place.

6.3 Limitations to and Success Factors for Citizen Participation

During this long-term process, the project team experienced that citizen participation faces many hurdles and limitations. Nevertheless, we could also identify factors that foster the success of the participatory processes. The limitations and success factors outlined below refer to the goals of the participation process as defined in the participation concept. We aim to assess the hurdles and remedies for achieving these goals and thus draw conclusions and recommendations for other participation processes.

6.3.1 Limitations to Citizen Participation

6.3.1.1 Difficulties in Reaching Different Target Groups

A first major challenge for the participatory processes was the fact that the future residents of the quarter were yet unknown and, thus, could not be targeted directly by the participatory formats. What is more, the construction of the buildings was delayed several times during the course of the project. The housing association defined target groups for the apartments in terms of household size and prize (e.g., low-income households, students for single apartments, some apartments for families), so that participatory formats should address a mixed target group. The project's approach was to reach different groups of citizens through a variety of different formats on different topics, that communicated via different channels and at different locations. However, many participants involved in the various participatory formats were not future tenants or house owners in the area so that the results of the participatory processes might be biased by individuals with other interests than the residents.

The Citizen Workshop as a regular format constitutes a chance to target especially those people with a specific interest in living in the new quarter. The evaluation of the Citizen Workshop confirmed that most participants of the meeting were interested in moving to the Fliegerhorst or the Helleheide quarter. Interestingly, most of the active participants in the Citizen Workshop can be categorised as elderly (above 60), which might be explained by the fact that these people avail of sufficient time resources to participate in this regular format.

Especially marginalised groups such as people with low income or education, and people who do not speak German as well as people with scarce time resources (such as juveniles and families) could hardly be reached by the participatory activities. To reach people with little time resources, an official leave to free them from their school, university or work obligations could be an incentive to participate. Moreover, a childcare service during participation events could encourage more families to take part in the events. In order to target marginalized groups, participation that ap-

proaches people in their everyday environment, e.g., when shopping or at festivals, could be a strategy. This type of participation also presupposes the openness of researchers to unconventional solutions and labour-intensive formats. This strategy was considered in the ENaQ project, but could not be carried out due to the COVID-19 pandemic as this type of participation requires an immediate and direct exchange. Other low-threshold participation approaches rely on the use of visualisations, habtic materials and playful approaches as partially applied in the ENaQ project.

Although many engaged and active citizens took part in the formats, our experience shows that there are also citizens who see themselves as "passive consumers". They would like to be informed about relevant developments (which affect them), but they are not interested in the systems in the background. It was considered as a task of the project to provide information to them and to keep the opportunities for a higher level of participation open.

To deal with this challenge that future residents are not known, some ENaQ partners implemented parallel participatory formats and pilot runs in an already established neighbourhood in Oldenburg with similar characteristics to the Helleheide quarter. The quarter Neu-Donnerschwee comprises an area of 18 ha based on a former barracks site. Since 2016, new buildings were built and old buildings were renovated in an energy-efficient way. Today, it is a residential area with social infrastructure (e.g. kindergarten, playground, bus connection) and open spaces. The quarter residents have formed a dedicated community aiming to be diverse, family-friendly and inclusive. This connection between Neu-Donnerschwee and Helleheide is not only a way to link the new quarter to existing similar projects in the city, but also provides opportunities for mutual learning and exchange.

6.3.1.2 Highly Technical Topics Requiring Extensive Prior Knowledge or Extensive Educational Efforts

Whereas the themes of the early participation process touched upon many topics of spatial development and social life, the ENaQ project focussed on the development of a quarter energy system combined with different ICT platforms. Many of the projects' topics concern high-tech solutions of new and intelligent renewable power systems that are not visible and difficult to understand for users. For example, the digital platform through which the communication with sensors and controllable devices is managed will not be visible to the users. Nevertheless, the highly complex decisions related to these solutions come with implications for the future residents of the quarter. Hence, to discuss technological topics with citizens, knowledge on these topics is required and it is difficult to convey it in a short time during a workshop. This requires large informational and educational efforts, which must be taken into account when budgeting time and financial resources for participation. Alternatively, complex

issues need to be boiled down to fairly simple questions and topics that are easier to understand but would leave out specific aspects.

Participatory events need to be designed in correspondence with the differing degrees of technical competence of the target groups. It is therefore particularly important to know the target groups of the participatory events and their prior knowledge on the topic. As it was not always clear, which audiences were reached and attracted by event invitations, tailoring the events for the participants needs was difficult in the ENaQ project. The Citizen Workshop gave the organisers a chance to get to know the participants better and design the methodologies accordingly. In this way it could be assured that the events were facilitated in a competent, citizen-friendly and sensitive way and that activating and interactive methods were used. For example, participants worked with layout plans and materials such as lego bricks which helped them to understand the physical dimensions of the buildings.

6.3.1.3 External Conditions

Although the design of the energy and ICT system of a new quarter offers room for participation, some limitations are defined by framework conditions such as the project proposal or the budget. Additional external requirements are set by natural, technological, juridical and financial structures. In the context of the ENaQ project, especially legal conditions played a predominant role. It turned out that the regulatory framework for numerous technological issues (especially in the energy sector) was often unclear, contradictory or very complex. In consequence, it was made sure that relevant actors such as decision-makers and planners were present in the participatory formats so that they could intervene directly when the suggestions became unrealistic. Another factor that may have influenced the participation process is the fact that there was still no physical place on the Fliegerhorst site itself where people could meet continuously and exchange ideas or work together on ideas. This circumstance might have driven the project to be perceived as somewhat intangible, unspecific and remote from the public.

6.3.1.4 Conflicting Interests and Mismatch of Expectations

While participatory processes generally seek to include a large variety of viewpoints and interests by multiple stakeholders, it is impossible to meet all demands that are raised. At moments when concrete development decisions have to be taken, a number of alternative ideas and opinions must inevitably be ignored or given second priority. We experienced that some participants of the early participation process got frustrated when they learned that not all of their ideas and suggestions were realised. Conflicting interests and a mismatch of expectations render participatory development

a delicate venture, especially as the topics of housing and energy supply might be emotional to many people. For example, the discussion about a bypass road which the municipality plans to build to release the existing feeder road of the Fliegerhorst raised a controversial debate. Since this new road will lead through an ecologically valuable biotope, a public debate and considerable resistance to this project has developed in the city of Oldenburg. This resistance is understandable insofar as the new construction of the street runs counter to the concept of a "sustainable" quarter. However, the current feeder road is already at its capacity limit, so that the construction of the new road seems unavoidable from a city planning perspective. The discussion reveals that, for often pragmatic or economic reasons, not all expectations can be met.

Nevertheless, Helleheide quarter is planned as a largely car-poor area. Compared to other residential areas, it provides a low key of parking spaces (0.6 parking spaces/ per residential unit) so that not every household can have a car and offers a neighborhood garage as common parking place. With the aim to increase the quality of life in the quarter, the streets within the district were declared as pedestrian zones. The outdoor space will therefore not be occupied by parking cars, but can be used for neighborhood meeting places, the garden and nature.

Although all ENaQ partners have agreed on the goal of sustainable development of the district, each has a very different view of the project. Industrial partners associate different economic interests and expectations with the project, while research partners pursue their own research agendas. Consequently, the interests and expectations of the participatory process are heterogeneous and not always evident. Overall, it is noticeable that there are few voices within the project that represent social concerns and needs. This underscores the need to acknowledge citizens as important stakeholders of the project.

6.3.1.5 Contact Restrictions due to the Covid-19 Pandemic

The contact restrictions due to the Covid-19 pandemic posed another great challenge to the project. The restrictions that were effective between 2020 and 2022 with phases of differing rigor prevented the organisation of larger physical meetings. Consequently, participatory methodologies that involved in-person meetings were not operable anymore and citizen participation was mainly limited to online workshops and surveys. These processes led to reduced possibilities of intensive co-design, conflict mediation and negotiation of interests on the one hand. On the other hand, the emergency situation encouraged the digitalisation process and led to the shift of social life to the digital area. Some participatory formats could take place online, these were complemented by online surveys. Additionally, a digital platform was set up where people could raise comments and contributions, and commented and supplemented

other people's ideas (https://werkstatt.enaq-fliegerhorst.de/#/start). Despite these efforts, it must be assumed, that these online formats excluded social groups which lack of resources, knowledge or interest in internet-based communication, thus exacerbating the digital divide.

6.3.2 Success Factors for Citizen Participation

6.3.2.1 Thorough Participation in an Early Stage to Set a Normative Basis

The extensive discussion and participation process that preceded the ENaQ project opened the doors for the subsequent development of the Helleheide quarter. A large range of citizens were involved in developing the guiding principles that set a common value base for the further development. When more technical questions were addressed in the later phases of the process, they were grounded on the normative basis to form a climate-friendly, affordable and socially diverse new quarter. The process also contributed to the generally high public interest in and support of the ENaQ project. Hence, many citizens follow the developments closely or are interested in living on the site. This also led to relatively high expectations and it is still questionable whether these can be met at the end of the project.

6.3.2.2 Planners and Decision-Makers are Present at Participation Processes

One feature of most participatory formats was that planners and decision-makers were present and participated in the discussion. On the one hand, they shared their knowledge and doubts with other participants. On the other hand, they listened to the ideas and concerns raised by the citizens. It was to the great advantage of the project that many important stakeholders formed part of the project. In this way developers and decision-makers not only received budget for the participatory approach, but were also bound to participate in project activities and information exchange. Thus, the housing association as owner of the area and buildings as well of the municipality of Oldenburg were very engaged and supporting project partners. Both the municipality and the housing association pursued the goal of creating a new quarter that is geared to the needs of the residents, valued the importance of citizen participation and took on the active role in organising citizen participation formats. The project benefitted from this "enabling" attitude.

6.3.2.3 Combine Technological and Social Benefits Offered in a Residential Quarter

The great public interest in the project is not only due to the housing shortage, but also due to the expected advantages and amenities of the life in the Helleheide quarter. In particular, the aim to form a socially mixed community attracts potential residents. The early participation process showed that people value a vivid community life, opportunities for leisure activities and green spaces that offer recreation. Although the ENaQ project had a technical focus, it was important to open the range of participation topics in this regard. The discussions in the Citizen Workshop revealed that technological innovations turned out to play a minor role to many of the (elderly) participants. Instead, they suggested physical communication through pinboards and shared activities. Therefore, the fact that the quarter is not only perceived as a technical and impersonal space is very important. The process also showed that technologies cannot be considered in separation from the people who use them. Even if people are not intrinsically inclined to adopt technological innovations, social incentives may be a channel to reach them and open the discussion on the advantages of technological solutions. Through participatory formats, participants could also get in touch with more technological topics such as “Energy Signal Lights” (that show consumers at which time energy should best be consumed), energy cooperatives and small photovoltaic systems on the balconies. In this way, synergies between the social and technological developments can be exploited.

6.3.2.4 Institutionalisation allows Higher Intensity of participation

In the early phase of participation, interested citizens raised the desire to remain transparently informed about further developments. Others lost interest after the first events and never returned. In order to do justice to these different interests, participation formats with different intensities were offered. A fixed format (the Citizen Workshop) was introduced so that committed addressees could be involved continuously and intensively in the discussions. The format offers the opportunity for close collaboration between developers and citizens. For example, the arrangement and equipment of the community rooms could be adopted to the wishes and needs of the participants. In consequence, two community rooms that are apt for different purposes (e.g. a laundry café) will be realised in the Helleheide quarter. In general, the regular format of the Citizen Workshop was very well received, as is allows intense collaboration on equal footing and empowers citizens to engage in complex discussions to make informed decisions. This was also confirmed by an evaluation questionnaire filled in by the participants. Nonetheless, different levels of interest are also reflected in this format, with some citizens regularly taking part in meetings, while others only remain silent readers of the minutes of the meetings and newsletters. It

also needs to be highlighted that this time-intensive format hardly reaches people with scarce time resources.

6.4 Conclusions and Outlook

The contribution presents a long-term participatory process from laying the normative foundation to the negotiation of detailed questions. This holistic view showcases the diversity of not only technological but also social questions raised along the development of smart city projects. Generally, our results confirm many of the supporting factors for the success of participation processes in the context of municipal sustainability management listed by Knipp/Lidner/Haubner (2020, see above). By identifying and analysing some specific limitations and success factors, we contribute to a more complex perspective that recognises the specific difficulties and ambivalences linked to participatory processes in smart city development.

We underline that citizen participation in the context of technological development in the housing sector should be an ongoing process, although high importance lies on the participation in the early stages of the project (before the development takes place). Laying the foundation for the further planning and development of the "Fliegerhorst", the early participatory processes were pivotal to involve broader audiences and to ensure support for the resulting master plan. In these early stages, the normative basis for the future development is laid and common objectives can be determined. As the interests of citizens differ, it is important to offer participatory formats with differing intensities. However, the goal to reach different target groups (especially marginalised groups) remains a challenge. The fact that decisions on technological solutions require openness and detailed technical knowledge puts a major hurdle to citizen participation processes. Nevertheless, it has to be acknowledged that for residents, quarters are predominantly physical spaces with recreational, social and aesthetic functions. Consequently, it is important to open the discussion to topics that exceed the technological focus of the project. Ideally, technological and social benefits can be combined in a synergetic way. One of ENaQ's strength is the development of a stable group of interested citizens who meet on a monthly basis. This format enables intense collaboration and empowerment through regular and close contact between planners and users. Moreover, the relation to an already existing quarter with similar characteristics is of great value, since it facilitates mutual learning and exchange. Despite these assets, the fact that the ENaQ project is linked to high expectations remains a challenge. Diverse interests and claims on the future development will inevitably lead to frustrations among certain participants and project partners as the development evolves. At the current stage, the buildings are not yet concluded and dwellers have not yet moved in. Thus, the question whether all raised

ideas can be implemented and if the quarter lives up to these expectations cannot be answered yet.

Furthermore, it remains questionable how the quarter and the community will develop after the ENaQ project ends in 2023. It will certainly be a critical step to hand over the responsibility to the community to fill the quarter with life. The municipality of Oldenburg is planning to set up a permanent service point for different experimental projects in the urban development context as well as a Smart City advisory board. Moreover, the municipality of Oldenburg made the decision to achieve climate neutrality by 2035. This ambitious objective is likely to intensify the debate about the design of new residential quarters beyond the Fliegerhorst area and Helleheide quarter and will certainly also give new impetus to the establishment of fixed participation structures. We are confident that many of our experiences can be transferred to other new or existing quarters and intend to assess the transferability of the participatory processes in detail until the end of the project.

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