

Article

Citizens and Positive Energy Districts: Are Espoo and Leipzig Ready for PEDs?

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Abstract: In urban transformation, no solution works without citizen support. With increasing numbers of building technologies and large-scale urban development on its way across cities, it has become vital to keep citizens informed, engaged, and content with the new changes. This paper looks at citizen engagement in Espoo (Finland) and Leipzig (Germany), and it determines whether the cities are ready for developing and implementing positive energy districts (PEDs). The authors studied the cities' operations and current citizen engagement methods to understand how the efforts could be combined and improved. The analysis indicated that the city of Espoo already has a well-established system that continuously promotes citizen engagement at various levels, and combining the available infrastructure with company experts on citizen participation will allow Espoo to seamlessly transition towards PEDs in the near future. The city of Leipzig has a rich experience due to several national projects and participation in an earlier European project, which enabled the city to set clearer goals for the future and modify existing citizen methods. As lighthouse cities, findings from Espoo and Leipzig are also aimed at cities across Europe and beyond to boost development of PEDs together with citizens.

Keywords: positive energy districts; citizen; cities; participation; citizen engagement



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1. Introduction

1.1. What Is Citizen Engagement?

Citizen engagement is collectively defined as public participation, stakeholder involvement, co-creation, civic engagement, participatory democracy, or activism [1]. It is also described as individual or collective behavior that focuses on determining the social problems of a community [2–4]. A clear definition of citizen engagement does not exist, but its true nature is the interaction between citizens and government [4].

Citizen engagement has a vital role in service delivery [5]. It is also said to be the 'meaningful involvement of individual citizens in policy or program development.' In other words, citizen engagement requires an active intentional dialogue between citizens and public decision makers [6].

Citizen participation may range from individuals participating in steering committees to partnerships with certain community groups. The Canadian Institutes of Health Research (CIHR) claims that there is no 'one size fits all' approach because each organization, scenario, or audience may require differing engagement practices. Bringing citizen voices into planning, decision-making, implementation, or evaluation processes requires two-way communication. Hence, input must not be pursued for the sake of input, but communication has to be interactive to generate 'informed participation' to reach a common goal [7].

As cities around the world look for ways to involve their citizens in various discussions, citizens themselves are eager to bring their ideas and concerns forward. However, in order to have a high level of inclusive engagement, it is essential to involve a broad and an unbiased selection of society as much as possible in the decision making processes [6].

To be able to make a true impact, citizen engagement has to be embedded in every stage of the decision making process and be conducted with deep commitment, proper allocated time, and co-creation interest. Merely adopting a tick-box approach or having citizen participation at the end of the process will not have the desired result or be beneficial for stakeholders. Citizen engagement has to be added in the 'Bold City Vision' and the overall targets of the project instead of making it an add-on activity. However, it is also a fact that municipal organizations and public servants do not have training to make citizen engagement as effective as desired, and the municipal procedures very often do not cater to involving citizens [6].

Nonetheless, capacity building solutions are now on the rise, e.g., in the Netherlands, a new legal framework for spatial planning called 'Omgevingswet' (Environmental Law) will soon be introduced, and it has participation and co-creation with citizens as one of the main pillars. The new framework does not offer a specific method, but it gives municipalities the freedom to develop their own approaches fitting to their local context [8]. The EU Joint Research Centre leads a community of practice (CoP) on citizen engagement having plans for a manual and online resource catalog aimed at organizations and project needs while also continuing an annual Festival of Citizen Engagement. Additionally, the Citizen Focus Action Cluster at the European Innovation Partnership on Smart Cities and Communities (EIP-SCC) congregates several initiatives and actions on citizen engagement and operates as a mutual learning and matchmaking platform [9].

1.2. The Necessity of Citizen Engagement

The question of the necessity of citizen engagement has been raised many times and may be answered with the fact that continuous innovations do indeed impact the everyday life of citizens while bridging many fields of urban life. A recent booklet published by Smart Cities Information System (SCIS) emphasized that the inclusion of citizens may help to address concerns, increases transparency about plans, and invites diversified and vulnerable groups who might not actively participate otherwise. In parallel, it also strengthens collaborative actions and bottom-up innovations, enhances the sense of trust and community ownership, and develops resource efficiency as unforeseen problems may be avoided; most importantly, citizen views can help explore more sustainable and viable solutions that may function better in the local context [6].

The emerging trend of positive energy blocks and districts (PEBs/PEDs) is a transition towards more energy-conscious behavior that calls for extensive and innovative engagement approaches and co-creation practices, as this will lead to citizens who understand, trust, and use and feel ownership of the measures adopted in their district [6]. Citizen engagement is essentially part of the quadruple helix innovation model that identifies four major actors in the innovation system: science, policy, industry, and society [10], hence placing a further emphasis on how participation can deliver new forms of deliberation and operationalization of the democratic process within the city, eventually leading to higher local impact and building citizen trust [6].

Citizen engagement has significant importance in relation to the success, development, and implementation of PEDs. A recent publication by the European Commission [11] described a PED as having defined borders and an area that:

- is based on open and voluntary participation, is autonomous, and is efficiently controlled by its citizens;
- has the primary purpose to deliver environmental, economic, or social community benefits;
- has an overall energy balance of zero or positive over a year;

- consists of buildings having very high energy performance, complying with minimum energy performance requirements and local building codes;
- consists of buildings that are either nearly zero or have a very low amount of energy demand;
- covers the building demand through renewable energy sources to a large extent; and
- has the possibility to produce renewable energy either onsite or nearby

In parallel to the above characteristics, the concept of ‘renewable energy communities’ has also emerged, as emphasized by the first and second points. For an energy community to be a success, the interaction and collaboration of all stakeholders is the key to find the best-fit solution for citizens. Nonetheless, municipalities must continuously to play their role in the energy transition and managing the collaboration. This also implies that social innovation, including behavioral change, has to be taken into consideration to deliver PEDs. There may be many non-technical obstacles along the way, but community engagement is vital to ensure the buy-in of community members [11].

1.3. What Is Happening Worldwide?

Cities are the melting pot for de-carbonization strategies relating to energy, transport, buildings, industry, and agriculture [12]. Cities have access to large capital and abundant know-how, and so they therefore have the ability to create economies of scale essential for the piloting and scaling up of new ideas [13]. Nonetheless, cities are in need of citizens who are not only political actors but also users, producers, consumers, and owners. A combined effort from these actors may have a huge impact on local urban areas, associations, and homes, thus propelling the climate transition, advancing the economy, and preserving the environment. As evidently said by the Mission Board for Climate-Neutral and Smart Cities, citizens and civil society have to be given more substantial roles, new platforms for action, and better resources [13]. The Mission Board will support 100 European cities in their dynamic transformation towards climate neutrality by 2030, eventually supporting the European Green Deal and becoming climate-neutral by 2050. Citizens are in the center of all action as the mission calls for citizens to be change agents and demands that cities focus on citizens’ health and wellbeing, healthier lifestyles, and adopting a ‘by and for the citizens’ way of thinking and working [13]. Cities are further pushed to put into practice the ‘leave no one behind’ (just transition) component of the Green Deal [14].

Allen et al. [15] evaluated the relationship between e-participation as a type of co-production and service performance by utilizing multiple large longitudinal datasets from a smart city mobile platform. The study gave evidence that citizen e-participation in co-production can increase the performance of service delivery, a link that is usually believed to be true instead of tested. Feedback and monitoring through the platform led to more issues being resolved, and service delivery had a larger influence on complex problems such as damaged roads, which generally require multiple actors and may need more time to be resolved. Simple issues such as waste management had less participation. However, e-participation may still be limited in general. Few researchers have considered why some citizens engage actively while others do not. A study by Choi and Song [16] in South Korea claimed that people with a stronger social capital—commitment, ownership of the community, and trust in government—have a greater likelihood to become part of e-participation. Emphasis only on technology-driven factors such as usefulness, ease of use, and perceived behavioral control become insignificant when tasks demand greater civic engagement. Attention has to be paid to how to nurture individual social capital (e.g., virtue of good civic norms) through proper procedures, as well as institutional and political reform [16].

Citizen engagement has remained a crucial component of smart cities in recent years. As these projects last for lengths of four-to-five years, cities have ample time to experiment and implement new tools and approaches. Nonetheless, two elements have to be considered for a smart city to be successful. First, citizens must be part of the design so that the smart city answers to the real needs of the people. Second, each city has distinct

characteristics that have to be included to create a citizen participation strategy truly tailored and adapted to the local context [17]. Simonofski et al. described five context factors that impact citizen participation strategies in two smart cities (Namur and Linköping): the smart city consideration, the drivers for participation, the degree of centralization, the legal requirements, and the citizens' characteristics. The factors are applicable for any city, however, because even though similar stakeholders and participations methods were used in these two cases (direct interaction, living lab, open data, and online platform), the methods were implemented for varying reasons that led to varying challenges being encountered [17].

With the emerging number of smart cities around the world, there has been strong focus on transactions between citizen and government. The presence of smartphone and smart city technologies have further stimulated micro-transactions between citizen, government, and information broker (for example, tax payment in exchange for services). Johnson et al. [18] explored how the modern smart city includes the citizen as a series of micro-transactions encoded on the real-time landscape of the city. This transactional citizen is monitored by smart city sensors and is integrated into smart city decision-making through certain platforms. The concept is based on four broad modes of transaction—type (intentional contribution), tweet (intermediated by third party), tap (convened or requested transaction), and pass (ambient transaction based on movement)—and enables one to understand how citizens interact and find potential avenues for private sector influence [18].

To provide a few examples of smart cities, the European funded IRIS project (Integrated and Replicable Solutions for Co-Creation in Sustainable Cities) created a planning framework to steer activities around co-creation and citizen engagement. The project created a citizen engagement ladder based on design and system thinking that includes phase 1: awareness-raising; phase 2: mapping; phase 3: scoping; phase 4: co-creation and design scenarios; phase 5: touchpoints and influencers; and phase 6: feedback loops [19]. Similarly, the CityxChange project developed the Citizen Participation Playbook to support local communities in PEBs and PEDs [20]. This project developed a roadmap of four distinctive citizen participatory processes as follows: process 1: the co-design of urban interventions; process 2: collaborative legislation; process 3: participatory budgeting; and process 4: citizens proposals. In addition, the project suggests best practices for effective citizen participation considering other smart city projects, European Commission initiatives and other organizations. These have been defined as (1) define the community; (2) clear purpose and front loading; (3) continuous engagement: capacity building and feedback; (4) open process, open source, and open data; (5) co-design, co-create, and co-produce; and (6) privacy by design [20]. The MAtchUp project has focused on several aspects such as participation, education and co-creation, and the local strategy of social services and local energy offices to mitigate energy poverty at the district scale, as well as citizen feedback channel for traffic management [21].

POCITYF (POsitive Energy CITY Transformation Framework), a similar European funded project follows a “rapid prototyping” approach that enables simultaneous and almost real-time feedback by citizens. The project focuses on incentives for co-creating, co-delivering, and co-capturing value, and it also caters to disadvantaged communities while promoting sustainable tourism [22].

The city of Tampere developed the Tampere. Finland, application as part of the innovative partnership of the Enlighten Tampere Hackathon process by Geniem Oy. The application uses open data and application programming interfaces (APIs) available in the city, and collects user location data for input on the smart street lighting system in the Viinikka pilot area. The application now has 45,000 users [23].

The mySMARTLife project focuses on the energy retrofitting of houses in Helsinki, Nantes, and Hamburg. Evidence has shown that single-family house owners in Finland are most concerned with energy savings [24], and it is usually very hard for housing cooperatives to buy comprehensive energy retrofits despite potential profitability [25]. For

this reason, energy advisory workshops held in Helsinki offered information on the most profitable energy retrofits, and both industry and city experts were invited to learn about the concerns, provide peer support, and initiate common projects [26].

CIVITAS ELAN “Mobilising Citizens for Vital Cities”, launched by the European Commission as part of CIVITAS (City VITALity and Sustainability), introduced transport measures and policies related to sustainable urban mobility and has the approach of ‘putting the citizen first.’ In Ljubljana, where citizen opinions were considered a burden and excluded from decision-making, the project team established a cycling platform to improve cycling conditions for residents and include the needs of disabled groups while also ensuring citizen participation through the new spatial plan. The city of Gent already had an active citizen population that was further enhanced by the use of dialogue cafes and social media to engage all age groups. Porto went through a change, as citizens who previously believed their suggestions would not be taken into consideration were pushed to voice their ideas through user interviews, face-to-face surveys, flyers, and brochures. In Brno, citizens were not used to discussions with transport operators, but after encouragement through public debates, public opinion research, and working groups, the traffic situation and mobility was greatly improved. In Zagreb, the lack of public participation was resolved through mobility dialogues, the training of citizens, the continuous provision of information, and the establishment of the Zagreb forum for direct discussions with experts [27].

1.4. Purpose of This Paper

The authors of this paper focused on the cities of Espoo (Finland) and Leipzig (Germany). They assessed the status quo of citizen engagement in the two cities and determined whether the cities are prepared to implement PEDs. This was the first analysis of its kind that focused on the cities of Espoo and Leipzig, as well as their citizens. It is envisioned that the analysis will also support other European cities in evaluating and enhancing their citizen engagement efforts and consequently support the energy transition towards PEDs.

The paper is structured as follows: Section 1 is the introduction to citizen engagement. Section 2 presents the approach and method adopted for the paper. Section 3 presents the selected case studies for each city, and Section 4 is the discussion and conclusion of the paper.

2. Approach and Methodology

The cities of Espoo and Leipzig have very different starting points regarding citizen engagement practices. As the next section shows, the existing infrastructure and regulations greatly vary between cities, consequently affecting how local activities are performed. This led the authors to perform an analysis of the two cities rather than a comparison of the two. It should also be highlighted that while the authors aimed to collect as diverse a portfolio as possible, part of the study material belongs to a European Horizon Europe (H2020) project where Espoo and Leipzig are lighthouse cities. As stated earlier, the topic of citizen engagement in the two cities has not been addressed in earlier studies, and this paper is a stepping stone for understanding and enhancing citizen engagement in both Espoo and Leipzig. A similar methodology was utilized for both cities to analyze and present the status quo of citizen engagement. The aim of the analysis was (1) to find the best local practice examples to build upon, (2) identify relevant (local) networks to cooperate with, and (3) to recognize (local) success factors for engagement activities.

The first step was to choose diverse case studies per city that showcased citizen engagement in urban development and transformation. The authors chose three case studies per city (Table 1) with the following criteria to assure relevance and to give a diverse view:

- (1) Identify case studies with relatable target groups.
- (2) Identify case studies with relatable objectives.
- (3) Identify case studies with relatable themes.

Table 1. Description of selected case studies.

	Espoo Case 1	Espoo Case 2	Espoo Case 3	Leipzig Case 1	Leipzig Case 2	Leipzig Case 3
Target groups	All citizens	Youngsters	Youngsters	Private building owners in the districts	Actors in urban politics, business, and science	All citizens
Objectives	Understand mobility needs and challenges	Understand future mobility from young people's perspective	Safety of youngsters when visiting shopping centers	Convince building owners to invest in energy efficient retrofitting	Develop a future strategy for the next 10–15 years	Development and planning of green and blue infrastructure
Themes	Urban mobility and sustainable lifestyle	Urban mobility	New construction and renovation projects	Reduce emissions and climate change	Sustainable future	Healthy environment for better wellbeing

The selection of the case studies to represent the city of Espoo was based on discussions with the city representatives and those responsible for conducting citizen activities within the H2020 project. In addition, the authors conducted a broad literature review to understand the city processes and to know what initiatives and resources for the citizens already exist. The city of Espoo already has a broad history of engaging residents in both small and large-scale activities (Section 3), such as through schools and city libraries. However, in order to assure relevance to the paper, the authors selected case studies that had been conducted as part of the project as they were more recent and directly connected to PEDs. The first and second case studies addressed a variety of citizen types and age groups while focusing on mobility, while the third case study addressed a target group of youngsters and focused on creating a safe environment. Overall, the selected case studies present the recent efforts of Espoo and allow for the assessment of what could be the next steps for the city.

The selection of the Leipzig case studies was based on an in-depth desktop research and literature review, discussions within the local the project consortium, and interviews with representatives of the city, including relevant project partners of the case studies. The first case study focused on the behavioral change of tenants in apartment houses in the field of energy-efficiency in daily life. The second case study related to target groups on a district level and was connected to the development of PEDs. The third case study focused on citizens and civil society actors, which will be of interest for more general engagement activities and to raise awareness for the topic of PED to facilitate replication activities across Europe.

The selected case studies presented a wide range of experience with participation formats over a period of several years and variety of citizens. The presentation of the case studies from Espoo and Leipzig in Section 3 is structured according to the following questions:

General questions:

- What are the main responsibilities, structures and processes of implementation in the cities?
- What methods do Espoo and Leipzig use to include citizens?

Case specific questions:

- What was the aim of each city case?
- How was it done? What was the format?
- Who was the audience? How many people were reached? What was the response?
- What could be changed for replication and better results?

3. Case Study Analysis

3.1. Focus on Espoo

The Espoo Story is the city's strategy of the future. It has been diligently prepared with intensive cooperation together with residents, staff, and elected officials. The Espoo Story directs the city's operations toward common goals. The city council approved the strategy in 2017 for the current council term of 2017–2021 [28]. Espoo is to have municipal elections in April 2021, and preparations for the new strategy have been ongoing since summer 2020. Values in the Espoo Story include the active involvement of residents in the development of services and comprehensive co-operation with partners.

The four administrative development programs until the year 2021 are: (a) Participatory Espoo (Osallistuva Espoo), (b) Inspiring and dynamic Espoo, (c) Sustainable Espoo, and (d) Healthy Espoo. The city is aiming for carbon-neutral status by the year 2050, and, in parallel, Espoo will attempt to reduce resident-specific emissions by 60% by the year 2030 compared to the levels of 1990 [29]. In Espoo, resident participation that has extensively utilized new methods and tools has existed and been promoted for a long time. In addition, the municipal democracy has also been continuously revised over the years. The city believes that Espoo residents are much happier than the residents in other parts of Finland [30]. In Finland, the basis for citizen involvement in city development is set as laws. The Participatory Espoo program developed a participation model, with cornerstones including a handbook. A new position of a development manager for citizen engagement has also been established and work started in August 2020. In order to bring Espoo employees located in different parts of city organization together, there is a participatory network to share ideas and information.

The Espoo Voluntary Local Review (VLR) is the framework to evaluate and communicate economic, ecological, social, and cultural sustainability, and it was developed with regard to the 17 Sustainable Development Goals (SDGs) of the UN's 2030 Agenda. The review was performed together with hundreds of people (Espoo employees, residents, customers etc.). It was based on three themes: (1) leave no one behind, (2) let us do it together, and (3) accelerated action [31]. Within the city structure, there are different councils that cater to the need of different age groups such as the youth council (nuva), which has been active for 20 years and comprises forty 13–18-year-old youths to contribute in the decision making and planning. The Espoo youth council is the largest in Finland, and it has representatives in the city council and committees with the right to attend and speak. In 2020, it was also agreed that the youth council representatives have the right to attend and speak at city board meetings. The Espoo Elderly Council serves as an advocate for the elderly in the municipal decision making. In parallel, there is also a council for the disabled. All councils together influence the planning and preparation of the city's activities, as well as monitoring issues relevant to well-being, health, inclusion, work-life, living environment, housing, mobility, day-to-day activities, and services [31].

Service development in Espoo is based on experimental culture and co-creation. The city as a service model has the following key aspects: the engagement of residents, the accessibility of services by means such as digitalization, and the creation and deployment of new business and operating models. In Espoo, this means that the city invites all stakeholders of municipal services from companies to associations, research institutions, and residents to refine old services and innovate new ones together. The joint "6Aika" strategy of the six largest cities in Finland aims to develop more transparent and intelligent services. It directs its focus on promoting transparent operating models that help the entire urban community, research and development actors, and authorities [31].

An overview of the residents in Espoo showed that the number of foreign-speaking residents in Espoo is gradually increasing. It is estimated that 18% of the Espoo residents speak a different language, and there are 150 different nationalities currently residing in Espoo [31]. Espoo citizens are able to give feedback to the municipal decision makers in a number of ways, either through an electronic feedback system [32] (<https://easiointi.espoo.fi/eFeedback/en> (accessed on 15 November 2020)) or traditional

methods of communication. As per the Local Government Act, the resident of a municipality has the right to propose an initiative, e.g., the improvement of street or traffic. The submission of a proposal is an official and regulated procedure that is handled more carefully than unofficial feedback messages. In addition, the city of Espoo arranges residents' evenings, where it is possible to influence projects and plans. The residents of Espoo may also influence matters that concern them through residents' forums. Each residents' forum also has a preparation team [33].

The three successful citizen engagement projects of the city of Espoo are presented as follows. These have been conducted as part of the ongoing European H2020 project as mentioned earlier and include several local partners (City of Espoo, VTT, KONE Corporation (KONE), and Citycon).

Case 1—citizen user studies (2020): This case study was led by KONE, which is a global leader in the elevator and escalator industry, as well as a solution provider for the maintenance and modernization to add value to buildings throughout their life cycle. KONE's current development efforts focus on urban flow and user experience in smart cities. The case study aimed to gain insights into Espoo citizens' mobility behaviors, i.e., understand the ways and reasons for people to transition from one place to another, as well as understanding the challenges and opportunities for designing behavioral interventions for more sustainable mobility behaviors. The user study focused on two diverse districts of Espoo: Espoonlahti and Leppävaara. The Espoonlahti district is a developing area where a new shopping center (Lippulaiva) is currently being built to replace the old shopping center and the construction of an underground metro is to be completed by 2023. The Leppävaara district is a fairly developed area, characterized by a shopping center (Sello) and good public transportation train connections (both local and long-distance train, bus, and tram to start operation in 2024). Thus, the mobility infrastructure and the opportunities for (behavioral) interventions between these two places greatly vary.

With a focus on these two districts, citizens' mobility behaviors were studied through mobile probing, interviews, and co-creation workshops. The citizen insights were supported with mobility and citizen engagement expert interviews in order to tie the findings from the user studies into a more systemic understanding. Citizen needs were put into the core of innovation, while relevant stakeholders such as city representatives and service providers in mobility were involved in the research and development process from the early stages of the project. The ultimate goal of the applied citizen engagement process was to develop and test behavioral interventions and smart ecosystems that support citizens' sustainable mobility behaviors and habit formation, as well as more sustainable lifestyles in Espoo by the end of 2022.

The citizens were selected through an application process advertised on local social media channels (Facebook). The application was open to all citizens in Espoo, and 41 respondents answered a preliminary survey. The citizens were asked to provide background information about their mobility modes (such as walking, biking, private car, public transportation, and micro mobility solutions), attitudes towards sustainability, and life situation. The final sample consisted of 10 diverse Espoo citizens, representing varying demographics (Table 2). Five of the participants were selected from the Espoonlahti district, and the other five were selected from the Leppävaara district to achieve a full understanding of mobility needs of Espoo citizens. The participants documented their daily mobility behaviors, as well as related experiences and thoughts through a mobile probing method in which images, text, videos, and voice messages were sent on WhatsApp for a period of eight weeks (Figure 1). The mobile probing method captured and communicated people's daily mobility behaviors on a holistic level, enabling a deeper understanding of citizens' mobility needs. The method enabled an active role for the citizens in the research and design process of future mobility [34]. KONE provided the participants phone devices to document their daily journeys. The mobile probing activity was supported with weekly questions and tasks sent on WhatsApp to prompt reflection on the participants' current mobility decisions and alternative mobility modes. After the eight weeks, participants were interviewed to

gain a deeper understanding based on the documented contents. In the final workshop, the participants co-ideated mobility concepts related to, for example, autonomous cars and material logistics based on the identified challenges and opportunities deriving from the user research. Due to COVID-19, all research activities during the study were held online and facilitated through digital platforms. Some challenges, such as limited digital capabilities and skills, were faced in the final workshop, as the participants did not have a prior experience of using digital co-creation platforms.

Table 2. Demographic information about the final research participants.

Gender	Age	Life Situation
Male	58	Spouse and two children (one living on their own)
Female	29	Spouse and a newborn baby
Male	41	Spouse and two small children
Female	20	Parents and sister
Male	44	Spouse and three children with active hobbies
Female	67	Spouse (using wheelchair)
Male	39	Single with three children (kindergarten/school)
Female	27	Living alone
Male	37	Living alone
Female	54	Teenage child every second week

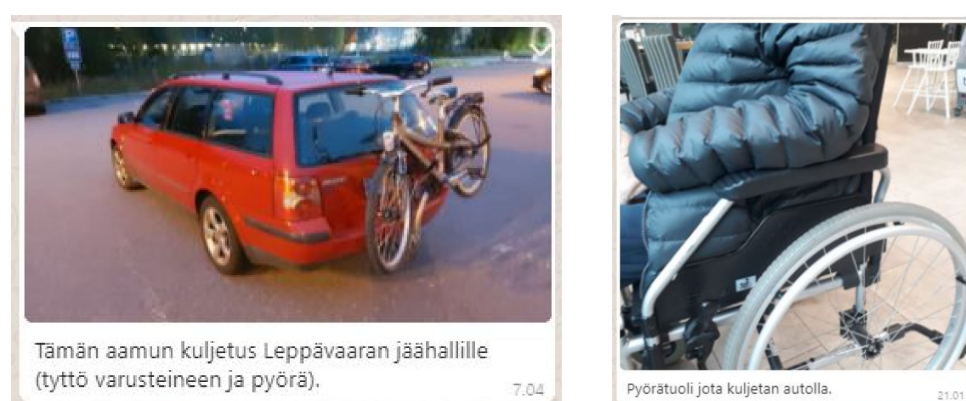


Figure 1. Two screenshots from the WhatsApp probing contents sent by the participants—driving daughter and her bike to the ice rink (**left**) and travelling with a wheelchair (**right**).

At the end of the final workshop, participants were asked for feedback on the quality of citizen engagement achieved through the user study. Through the described comprehensive citizen engagement process that lasted for four months in total, a holistic understanding of various Espoo citizens' mobility challenges, needs, and desires was gained. It must be highlighted that informed consent was signed by the participants to maintain their privacy and data protection during the study period.

Case 2—testing a participatory design research workshop concept with youth (2020): This study was also led by KONE and arranged as part of a high school entrepreneurship course. A group of nine students (aged 17 years) were invited to a participatory design research workshop with the aim to investigate desirable future (sustainable) urban mobility from young people's perspective. Participatory design research workshops (1.5–2 h) were conducted on five themes: pedestrian, bicycling, public transportation, shared mobility, and mobility inside hybrid buildings. The workshop was formed around a case of an imaginary new living area currently developed in Espoo.

The workshop was facilitated face-to-face. In the workshop, the youngsters were asked two questions: “What kind of challenges do you experience related to the above-mentioned themes?” and “What would be your dream user experience (based on the five themes)? The ideas were organized through post-its, e.g., blue post-it-notes illustrated the challenges and yellow post-it-notes showed the desires (Figure 2).



Figure 2. Youth discussing the workshop results related to their future mobility needs and wishes.


The preliminary findings of the workshop indicated that the youth experience many challenges related to their current mobility. These challenges were related to matters such as weather and dressing, road safety, bike storing, noise pollution, and crowding. In addition, many desires for an improved city infrastructure that supports walking, biking, and public transport were communicated in the workshop. According to the participants, this could be achieved by creating a mobility infrastructure with reduced noise pollution and shorter distances to places. All the students received a sticker for voting on the change that they would prefer in the close future of urban mobility developments. The workshop also helped build empathy for this sometimes-marginalized target group and allowed the experts to understand the criteria for future urban development efforts. The next step would be to plan and organize collaborative workshops for ideating more tangible ideas for tackling the identified challenges and high-level desires.

Case 3—co-creating shopping centers together with youngsters (2012 and ongoing): Shopping centers can be characterized as quasi-public spaces that may be defined as being open to all but are under private ownership [35]. Citycon is a leading owner and developer of mixed-use centers for urban living located in the Nordic region [36]. In Finland, Citycon owns and manages 12 centers, and the largest one called Iso Omena is located in Espoo. It attracts approximately 19.9 million visitors yearly and is a great example of urban mixed-use center with retail, public services (such as library, health care, and social insurance institution office), office spaces, and housing. This makes Citycon shopping centers even closer to public spaces where citizens handle multiple activities.

The aim of the workshop was to ensure that young citizens feel safe and comfortable while visiting shopping centers and that they are aware of the common rules to behave in shopping centers. The three main citizen engagement highlights for young citizens implemented in the shopping centers are: (1) co-creation workshops, (2) making common shopping center rules together, and (3) working with shopping centers’ guards (known as NOJA-guards) devoted and educated to work with youngsters (Table 3). In Finnish, the NOJA Guards is derived from *nuorten oma järjestyksenvojoja*[®] and translates to youth’s own security guard. All these activities were developed and held together with Nuorten Palvelu ry [37] an organization that works with and for the youth and whose support was crucial in order to reach as many young people as possible.

Table 3. Targets and timelines of different youth citizen engagement actions developed and held in Citycon together with Nuorten Palvelu ry.

	Co-Creation Workshops	Making Common Rules	NOJA-Guards
Target	To involve youngsters and to idea together	To make common rules of behavior in shopping center	To have known and safe adults to help youngsters in shopping centers and to decrease the amount of disorder
Timeline	During renovation or construction project	Before opening or when needed	While operation



The co-creation workshops are organized for youngsters when larger renovation or construction projects are ongoing. For example, the Iso Omena shopping center in Espoo was expanded in 2013–2017, so several co-creation workshops were held during that time. Approximately 20–30 youngsters (aged 12–16 years) participated in the workshop and worked together with architects, youth workers from Nuorten Palvelu ry, representatives from Espoo library, and security guards. The youngsters were invited to directly participate in the workshops by the NOJA guards who were present in the shopping center. In addition, Nuorten Palvelu also invited youngsters through their own networks. These methods ensured diversity amongst the group.

The workshops were conducted in an interactive manner where the construction project was first described to the youth, and later the youngsters were divided into groups to work on different topics. A few of the most popular ideas from the workshop were developed further (Figure 3). At the end of the workshops, the youngsters were rewarded with movie tickets for their valuable contribution.

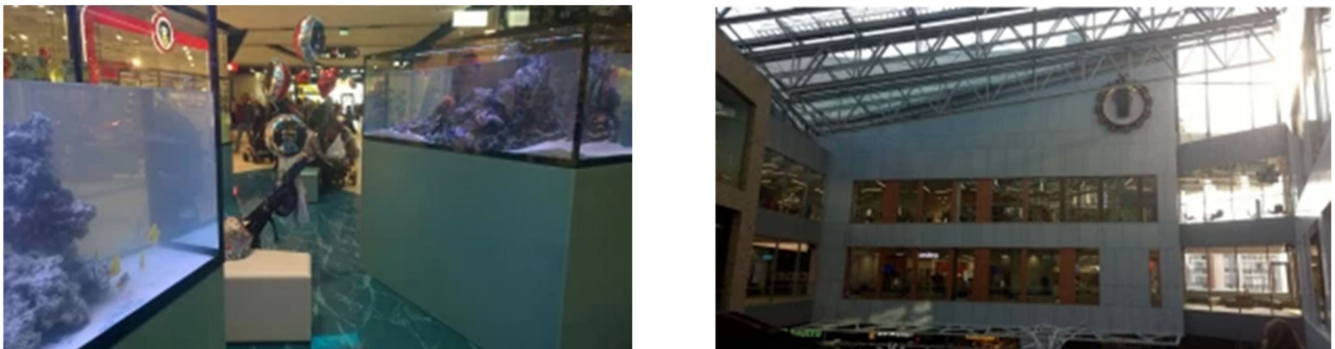


Figure 3. Ideas from youngsters that were realized in Iso Omena—large aquariums (left) and a large clock in Iso Omena (right). These ideas came from youngsters, and they were planned together with Citycon employees.

By making rules for the shopping center together with youngsters, the designers and building owners had the opportunity to understand and solve problems that may have been overlooked. The youngsters invented possible rules applicable to all the visitors in the shopping centers. It was assumed that rules that are made together are usually obeyed better compared to rules given from above (managers). NOJA-guards (security guards) are still active, and they are educated and devoted to work with young customers. Observation showed that shopping centers with NOJA-guards have decreased the amount of disorder. Their presence is also a great way for shopping center owners to pay attention to young customers, implement social responsibility, and increase the amount of positive publicity.

3.2. Focus on Leipzig

Leipzig is the initiator and namesake of the Leipzig Charter on Sustainable European Cities [38], which was signed by 27 EU member states in 2007. The Leipzig Charter was the basis for a new urban policy in Europe, in particular for the concept of integrated urban development, which emphasizes the involvement of residents and an improved dialogue between representatives from politics, residents, and economic actors. The current framework for urban development in Leipzig is formed by the strategic goals of municipal policy, manifested in the integrated urban development concept “INSEK Leipzig 2030” of 2018 [39]. The main four target areas for Leipzig are: quality of life, social stability, national and international importance, and competition between cities and regions. These target areas are concretized by defining specific focus areas and technical concepts. One of the main goals of Leipzig is to be climate-neutral by 2050, and the city administration itself plans to be climate-neutral by 2030 [40]. Citizen and stakeholder engagement is explicitly listed as one of the principles of the INSEK implementation strategy.

In Germany, the law requires various forms of citizen engagement such as citizen petitions, citizen meetings, participation in city district and local councils, and formal public engagement in urban land use planning. However, many municipalities have established local guidelines that go beyond these legal requirements in order to include the perspectives of their citizens, to identify barriers early, and to improve the acceptance of their actions. In 2009, Leipzig started to develop a framework for an informal citizen participation resolution involving various actors from politics, science, administration, and citizenship. In 2012, the guidelines for citizen engagement [41] were manifested as the mayor’s instruction to the city administration. They included the involvement of the citizens, city council, and administration in municipal processes in all areas of responsibility (dialogue principle), and they defined citizen engagement as an integrative part of these processes. Key points related to transparency and cooperation in decision-making. The basic principle is the “early and continuous involvement of citizens in planning and decision-making processes.” In addition to the strategic goals, the guidelines contained recommendations for implementation, as well as a set of instruments.

Depending on the character of the projects, various offices are responsible for planning and implementing urban participation processes. Since 2014, they have been supported by the “Leipzig Weiterdenken” coordination center (“Thinking Leipzig Ahead”) [42]. Its area of responsibility can be divided into three fields: Coaching and consulting within the city administration, testing innovative processes, and finally evaluating the implemented projects. In 2015, the strengths and weaknesses of the participation culture in Leipzig were analyzed. As a result, the coordinating office has since then maintained a central communication platform that provides transparent reports on completed, ongoing, and planned participation projects. The central participation structure also includes the city office [43], as a platform for citizen participation and commitment, and the youth parliament [44].

Successful formats of decentralized participation management include regular district forums, Leipzig neighborhood management, and district offices. District forums are organized by the city in the context of ongoing participation projects to inform the residents of a district about urban projects and to stimulate discussion. By making a representative selection of participants and embedding smaller discussion groups, the citizens’ opinions can be analyzed in a representative way. In some key areas of urban development (the districts of Grünau, Leipzig East, Leipzig West, Paunsdorf, and Schönefeld), neighborhood or community management acts on behalf of the office of residential construction and urban renewal (AWS), implemented by private agencies. Neighborhood management is always connected to national or European urban development funding programs (e.g., Soziale Stadt, Stadtumbau Ost, and URBAN (European initiatives)). Its task is to initiate communication between administration, politics, and local stakeholders, as well as to support local associations, initiatives, and projects, thus strengthening identification and the culture of participation in a neighborhood. The specific design of a management structure is based on the needs of the respective area. Neighborhood councils have been

formed in two of the priority areas (the districts of Grünau and Leipzig West) as points of contact within the neighborhood, as well as for city administration and politics. These councils consist of citizens or representatives of citizen committees and representatives from other thematic areas (child and youth work, culture, education, housing companies, local economy, church, social affairs, etc.). In the context of neighborhood management, the city operates district offices in some districts as points of contact for residents.

In addition to the experience gained from local projects, Leipzig also has experience with European smart city projects. From 2015 to 2020, Leipzig was one of the follower cities in the project *Triangulum* [45], focusing on cutting-edge concepts for smart district development. Within this project, the city developed an implementation strategy for smart city solutions in the sectors of energy, mobility, information, and communications technology for the Leipzig West area. Moreover, the findings of the *Triangulum* project have been considered in the development of the 2030 Leipzig INSEK Integrated Urban Development Concept.

The three successful citizen engagement projects of the city of Leipzig are presented as follows.

Case 1—Energy-efficient Retrofitting Management (ESM) (2015–2018): The ESM [46] established in two districts (Alt-Schönefeld, Lindenau-Plagwitz) in 2015 was part of the Leipzig Energy and Climate Protection Program 2014–2020, developed for European Energy Award certification. The objective was to convince building owners to invest in energy-efficient retrofitting, thereby improving the energy balance of the district. For this purpose, the seecon Ingenieure GmbH (Leipzig, Germany) and the Deutsche Stadt- und Grundstücksentwicklungsgesellschaft mbH & Co. KG, Regionalbüro Leipzig (DSK, Leipzig, Germany) established a desktop support system for measures to reduce emissions and to adapt to climate change, especially regarding integrated neighborhood concepts, as well as to improve the energy efficiency of buildings and infrastructures. The main target group comprised private building owners in the districts. The different formats have reached between several dozen (consulting) and several thousand people (campaign) and are as follows [46,47]:

- Postal and telephone contact with residential building owners (2015–2016).
- Energy and retrofitting consulting for private owners and tenants (2015–2017).
- Public event on the occasion of the cooperation with the Consumer Advice Center combined with exhibition (2016).
- Energy and retrofitting consulting in cooperation with the Consumer Advice Center Saxony (2016–2018).
- Joint campaign “Leipzig is Climate Conscious” with the Department for Environmental Protection (AfU) and the Department for Urban Development and Construction (ASW)—inserts in the district journals combined with vouchers for free energy consulting (2017).
- Thermography tour: guided thematic walk (2017).
- MobilityChange stakeholder workshop in the neighborhood: common elaboration of practical project ideas and suggestions (2015).
- Talks on cooperation for environmental education projects with local education actors and schools in the neighborhood, as well as the presentation of coordinated project outlines (2015).

During the three years of this project, it became clear that the function of a municipal advisor for energy issues with the option to advise key stakeholders and interested private owners is an important task for future district management. In the case of private owners, a high proportion of owner-occupiers is advantageous, as investment-oriented property owners of apartment houses have little interest in energy-efficient, socially-responsible renovation measures due to the lack of incentives on the rental market in Leipzig. Cooperation with the municipal or cooperative owners of apartment houses is also promising. In these cases, the tenants are to be involved in order to gain their acceptance and support. In addition, community or commercial facilities showed clear interest in the energy opti-

mization of the building fabric and management. Here, the commercial tenants should be involved as well.

One of the most important conclusions to be drawn from this ESM project is that the cooperation with key stakeholders in the district, who take over the function of multipliers, is essential for the successful involvement of local residents. If no stakeholder networks exist, a network and trust building phase has to be scheduled.

Case 2—2030 Leipzig INSEK Integrated Urban Development Concept (2015–2017): One of the biggest and most successful participation projects in Leipzig was the participative development of the 2030 Leipzig INSEK Integrated Urban Development Concept [48,49]. Based upon the previous integrated urban development concept, SEKo 2020, the city planning office initiated a participative process to mutually design the approach for realizing the strategic vision for Leipzig 2030. This participative process was managed by the “Thinking Leipzig Ahead” coordination center and an external agency. The objective of the project was to develop a future strategy for the next 10–15 years to ensure economic power, finances, understanding of democracy, and natural resources. The different formats have reached between several dozen (workshops, forums) and several hundred people (presentations) [50,51]:

- Public kick-off event (2015).
- Four thematic workshops: moderated discussions in small and big groups, partly combined with presentations, exhibitions, and speed dating with city administration staff (2016–2017).
- Four district forums: moderated discussions in small groups combined with presentations (2016).
- Three working groups: discussion at the LivingLab Leipzig West (2016).
- Public presentation and discussion of the draft (2017).
- Presentation of the draft in five district forums: Grünau, Leipzig North, Schönfeld/Mockau, Leipzig East, and Paunsdorf (2017).
- Exhibition on the concept supported by Leipzig Lego model makers (2017).

The main topics of the participative discussions were defined as follows: challenges for living together in a growing city, future growth of the medium-sized economy, further spatial development, digital city, sustainable mobility, and active urban society. The contents of the discussion were based on sectoral plans, such as urban development plans and specific field-related plans. City administration, several city departments, and various interdepartmental working groups were involved in the planning and development process. The target groups of the participation formats were either the urban society per se or specific actors in urban politics, urban society, business, and science. The findings and results of the workshop and forum discussions, and thus the opinions and wishes of the citizens of Leipzig, were integrated into the concept.

The city of Leipzig gained a lot of experience in involving different stakeholders using various participation formats dependent on the specific objectives, the size of the participant group, and the level of involvement. One of the key aspects throughout the process was transparency—all steps and results were documented and published on the city’s website.

Case 3—Green Masterplan: Leipzig green–blue 2030 (2018–2020): The Green Masterplan [52] is a development concept for the green–blue infrastructure of Leipzig (green space and waters). It is meant to become the politically accepted, socially accepted, and application-oriented basis for upcoming decisions on the spatial development of the city. Results from the Open Space Strategy 2017 are part of the 2030 Leipzig INSEK Integrated Urban Development Concept. The Green Masterplan shall define specific implementation concepts for green space and water design. The participation process is managed by the Office of Green Space and Waters (ASG).

The objective of the project was to involve citizens in the development and planning process of the green and blue infrastructure for the purpose of healthy environmental conditions, individually usable recreation and exercise opportunities in open spaces that

are accessible to all, and promoting health, as well as a biotope network for species and habitats. The different formats have reached between several dozen (for consulting and workshops/green walks) and several thousand people (for campaign and survey) [53]:

- Online survey on attitudes and expectations (2019).
- Two citizen forums: discussion in groups with different questions combined with presentations and exhibition of online survey results (2019–2020).
- Four thematic workshops: discussion at round table combined with presentations (2019–2020).
- Green labs: various activities that turn urban green spaces and water bodies into a cultural experience and field of experimentation.
- Green walks: regular moderated walks on different topics combined with the presentation of the Green Masterplan; participants wear green vests and there is a record of observations/suggestions on cards/posters (2019–2020).

The main topics of the participative discussions were: environmental protection, health, climate adaptation, biodiversity, environmentally-friendly mobility, and urban gardening. The main target group of the participation process was the urban society—citizens and civil society actors. Points of critiques and proposals arising from these forums and workshops are to be included in the Green Masterplan. In addition to conventional formats, the city uses creative formats such as green labs and green walks to strengthen the citizens' relationship to their city and to raise awareness for their environment.

4. Discussion and Conclusions

The United Nations Intergovernmental Panel on Climate Change's claims that there are 11 years left to save the planet before an irreversible climate catastrophe occurs. The climate urgency is to be resolved not only on the macro level but also at the local level where municipalities are required to engage in the transformation of the use and production of energy for the wellbeing of citizens [54]. While PEDs are low-carbon solutions for cities, they must provide co-benefits to citizens and local authorities (such as better wellbeing and health, job creation, increased gross domestic product (GDP), and tourism) [11]. In addition, success with a PED requires that all stakeholders join forces to develop the best-fit solution for and by the citizens to tackle the global climate crisis. Furthermore, the new Green Deal released by the European Commission demands new and more effective ways of including city leaders, authorities, and citizens to establish political dialogue across various levels of government [55]. In parallel, the concept of 'renewable energy communities' is also being discussed and holds great importance when planning the implementation of PEDs. Looking at the definition of PEDs provided in the report by the European Commission, there is a clear and strong emphasis on ownership by citizens and change being led by citizens [11].

This paper performed an analysis of the status quo of citizen engagement in the two emerging cities of Espoo and Leipzig, where the local authorities, together with the local partners, have planned several actions to initiate the uptake of PEDs for a carbon-neutral sustainable future. It has to be recognized that these cities have had very different starting points and varying experiences, so it is not feasible to make a comparison; rather, it was feasible to study the current situation and provide support in progressing towards the successful implementation of PEDs.

Through this paper, it can be seen that there is no one definition for citizen engagement in cities. Citizens play an active role in defining issues, finding solutions, and identifying priorities for action. However, involving citizens is voluntary for cities, and such an inclusion process varies between cities and may be even lacking completely in certain cities.

When discussing how the city of Espoo plans to create a smooth transition to PEDs together with citizens, the authors looked at some of the planned actions, such as engaging different age groups. In parallel, the city is determined to encourage a sustainable lifestyle with a special emphasis on urban mobility behaviors and citizens' daily journeys by following a design thinking process and utilizing methods from co-design. The described

case studies provide evidence that the city and its expert partners can effectively engage a variety of actors, and the participation formats may be readily adapted to suit current requirements. With the existing participation infrastructure within the city, spanning over decades, building up and replicating the described citizen engagement activities will be easy to do. As citizen engagement is also part of Finnish law, over the years, there has been a strong emphasis on co-creation and encouragement of participation through the local council meetings, forums and through local networks across Finland. In addition, Espoo frequently conducts city-wide online surveys on different topics, such as 'Mun Espoo' (My Espoo) where residents indicate their satisfaction with the city services and provide suggestions.

The Espoo case studies illustrated how Espoo has worked with different age groups on various topics. The recruitment of citizens could be a challenge, but it may be resolved through rigorous promotion and reaching out to residents through various channels, such as social media, and providing motivation for participation. The youth are considered a marginalized group of society, but the experts have reached the youth through various methods to gather as diverse a group as possible and to ensure that all opinions are heard. Based on the success of the youth workshops, the city of Espoo has now begun work with two junior high schools and its students to plan a new shopping center in Espoo. Considering the global pandemic, this activity has been adapted to an online format, and co-creation with the students continues. It must also be highlighted that because the purpose of the Espoo workshops was to hold discussions on a general level and to hear citizen concerns regarding city development, the actual development of ideas that might include intellectual property was not realized and there were no issues related to ownership of ideas.

For the city of Leipzig, the former participation projects were found to be a good basis for further developing its participatory approach in urban development and energy transformation. The objective is to involve and to enable residents and local stakeholders in the planning and implementation processes of positive energy districts in urban society. This includes both convincing stakeholders who are directly involved and raising general awareness for the topic itself. Networking and cooperation with existing structures that already form a central point of contact in a district have proven to be advantageous. They can provide a first assessment of relevant stakeholders and their needs, and they can arrange for relevant contacts. Established structures and local key actors are perceived as trustworthy and can successfully promote project activities as multipliers. Similarly, the establishment of a permanent contact point for stakeholders has also proven useful. One of the promising formats with transfer potential for energy topics is ESM energy consulting in cooperation with the consumer center in Saxony, which could conceivably accompany the introduction of certain products or activities. The consumer centers in Germany are non-governmental organizations representing consumers' interests. They enjoy great trust among the population as advisory bodies for energy issues, among other things, and can be valuable partners in energy-related projects. As a third point, the participation format differs for each target group. One of the lessons learned from the ESM project is that there are no adequate incentives for investment-oriented property owners of apartment houses in Leipzig to improve the energy performance of their buildings. On the other hand, local tenants have little influence on the owners' decisions because they have no levers under the current circumstances. The better target group for energy-retrofitting are the owner-occupiers who directly profit from this kind of investment in the end (socially and economically). Tenants, in turn, are limited in their action and are the right target group for promoting energy-saving activities in everyday life. In the end, the city has to define different starting points and goals for different target groups with different frameworks of action.

This paper aimed to answer the question whether the two cities are ready to implement PEDs; considering the background of each city and the diverse experiences that each one has in engaging actors, it may be said that both Espoo and Leipzig are prepared to

effectively move towards the implementation of PEDs in a citizen-inclusive manner. A variety of citizens have been invited to participate and provide input on services and development projects in both cities. The inclusion of the young generation, children, teenagers, and vulnerable young people is crucial in urban development because it leads to awareness on energy transition from an early stage, builds up or strengthens the emotional bond with their own neighborhood, and creates ownership. Moreover, as early adopters, children and young people can exert a motivating influence on their local environment, including their family. For this reason, it is important to include special engagement formats for this target group, as observed in the Espoo case studies. The cooperation with local schools, education centers, and training centers in the district, as well as with associations and sponsors of children's and youth work on site, should be part of projects dealing with urban development. Citizens must also feel that their opinions and feedback are heard and considered by the experts. Therefore, it becomes essential that interaction with citizens is not carried out for the sake of interaction. Instead, experts have to be ready to modify and adapt the plans based on citizen needs. In parallel, it must also be highlighted that common formats such as presentations, discussions, workshops, and working groups, sometimes combined with informational formats such as exhibitions, are indispensable parts of the participation strategy according to the project phase, the defined target group, and the purpose of the activity. Depending on the circumstances, the influence of participants ranges from information to the development of proposed solutions and co-creative formats. Additionally, it is advisable to include more event-like and creative formats to raise awareness, create emotional impact and get into discussion with local residents. The 2017 exhibition on INSEK Leipzig 2030 was supported, e.g., by Leipzig Lego model makers. The Green Masterplan, and the ESM project provided guided thematic walks or tours illustrating real-life implications of political topics.

With the global pandemic, the key question is the adaptation of participation plans. The crucial points are not only the different levels of digital literacy, access to digital infrastructure, and of willingness to use digital technologies but also the mode of interaction itself that differs of course from that of face-to-face events. Recent developments have forced us to rethink our concepts and to include much more digital activities than intended. Certain activities, however, have the capability to be immediately adapted to the online space, e.g., the user mobility study was conducted entirely remotely through phone devices. Workshops held by the city, such as inviting residents to develop new participation ways, have already been switched online. In the coming months, the cities of Espoo and Leipzig will investigate inclusive digital and hybrid participation formats, and they will adapt them further to create innovative use cases for the development of PEDs for replication across Europe. Moreover, the cities will look into possible key performance indicators (KPIs) that could be deployed to measure success with citizens through different participation formats and to assess how these could be adapted to suit the different contexts across Europe.

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