TURUN
YLIOPISTO
Matemaattis-luonnontieteellinen
tiedekunta

Community Participation in Urban Open Innovation Projects

Case Study of the Innovation Intermediary Organization Forum Virium Helsinki

Ella Keinonen

Geography (Sustainable Cities and Communities)
Master's thesis
Scope: 30 credits

22.5.2025
Turku

Pro gradu -tutkielma

Pääaine: Maantiede
Tekijä: Ella Keinonen
Otsikko: Community Participation in Urban Open Innovation Projects
Ohjaajat: Dr. Lauri Hooli, Turun yliopisto & Dr. Ana Rita Amaral, Universidade de Coimbra
Sivumäärä: 80 sivua
Päivämäärä: 6.4.2025

Tässä opinnäytetyössä tarkastellaan asukkaiden osallistumista innovaatioiden välittäjäorganisaatio Forum Virium Helsingin (FVH) toteuttamissa urbaanin avoimen innovoinnin projekteissa Helsingissä. Tavoitteena on ymmärtää osallistamisen tavoitteita, käytettyjä osallistavia menetelmiä sekä niiden onnistumista asukkaiden osallistumisen edistämisessä. Tutkimus toteutettiin laadullisena tapaustutkimuksena, jossa hyödynnettiin osallisuusprosessien vertailuun kehitettyä COPP-viitekehystä (Comparison of Participatory Processes). Tutkimus tarjoaa syvällisen analyysin osallistavista käytännöistä eri projektivaiheissa sekä niitä ohjaavista kontekstuaalisista tekijöistä. Lisäksi se tarkastelee asukkaiden osallistumista edistäviä ja estäviä tekijöitä valituissa projekteissa.

Retrospektiivisessä tapaustutkimuksessa analysoitiin yksityiskohtaisesti seitsemää projektia hyödyntäen triangulaatiota, joka koostui kymmenestä haastattelusta sekä monipuolisesta kirjallisesta aineistosta, kuten raporteista, arvioinneista ja julkaisuista.

Tutkimuksen tulokset on jäsennelty neljän projektivaiheen mukaan, sillä osallistumisen tavoitteet ja lähestymistavat vaihtelevat projektin elinkaaren aikana. Tulosten perusteella asukkaiden osallistumisen laajuus ja luonne muuttuvat vaiheittain. Osallistuminen on aktiivisinta alkuvaiheessa, jolloin kartoitetaan tarpeita, haasteita ja toiveita esimerkiksi kyselyiden ja pop up -tapahtumien avulla, sekä toteutusvaiheessa, jossa asukkaat osallistuvat usein pilottikäyttäjinä. Sen sijaan ratkaisujen suunnittelu- ja arviointivaiheissa osallistaminen on passiivisempaa, mikä rajoittaa asukkaiden näkemysten ja kokemusten hyödyntämistä. Keskeinen havainto on, että osallistuminen jää tarkastelluissa projekteissa pääosin tiedottamisen ja kuulemisen tasolle, vaikka yhteiskehittämisestä puhutaan paljon. Käytännössä yhteiskehittämistä asukkaiden kanssa toteutettiin harvoin.

Tämä tutkimus vastaa tunnistettuun tutkimusaukkoon tarkastelemalla käytännön osallistamismenetelmiä, joita innovaatioiden välittäjäorganisaatiot käyttävät asukkaiden osallistumisen tukemiseksi. Se tarjoaa syvempää ymmärrystä siitä, miten toimijat kuten FVH ottavat asukkaat mukaan kehittämistyöhön, ja antaa arvokkaita näkökulmia osallistavien käytäntöjen kehittämiseen tulevissa kaupunkikehityshankkeissa.

Avainsanat: asukasosallistuminen; innovaatiovälittäjä; avoin innovaatio; osallistamismenetelmät

Master's thesis

Subject: Geography
Author(s): Ella Keinonen
Title: Community Participation in Urban Open Innovation Projects
Supervisor(s): Dr. Lauri Hooli, University of Turku & Dr. Ana Rita Amaral, Universidade de Coimbra
Number of pages: 80 pages
Date: 6.4.2025

This thesis investigates community participation facilitated by the innovation intermediary Forum Virium Helsinki (FVH) within urban open innovation projects in Helsinki. The aim is to understand the objectives of participation, the methods employed, and their relative success in fostering community participation. Using a qualitative case study approach and the Comparison of Participatory Processes (COPP) framework, the research provides an in-depth analysis of participatory practices across different project stages, their contextual determinants, and explores the key drivers and barriers influencing community participation in selected projects.

The retrospective case study examines seven projects in detail through data and method triangulation, including ten interviews and a range of written materials such as reports, deliverables, evaluations, and publications.

Findings are organized according to four project stages, acknowledging that participation objectives and approaches vary throughout the project cycle. The results show that both the extent and nature of community participation shift depending on the stage. Notably, engagement is strongest during the early phase, where needs, challenges, and preferences are gathered through tools like surveys and pop-up events, and during the implementation phase, where communities usually participate as test users. In contrast, participatory activities are more passive in the solution design and evaluation stages, which limits the inclusion of valuable insights from their perspective. A key finding is the predominance of consultation- and information-level participation across the examined projects, while co-creation, though frequently discussed, was rarely realized in practice.

This study addresses a research gap by examining the practical methods used by innovation intermediaries to foster community participation. Ultimately, it contributes to a deeper understanding of how actors like FVH engage communities, offering valuable insights for improving participatory practices in future urban development initiatives.

Key words: community participation; innovation intermediary; open innovation project; participatory methods.

TABLE OF CONTENTS

1 Introduction

Over half of the world's population lives in cities. Urbanization is expected to continue rising, with nearly three-quarters of Europe's population living in urban areas by the middle of the century (United Nations, 2018). Cities foster creativity, opportunities and innovation, while enhancing well-being through social connections and in-person interactions (Asheim et al., 2011; Camboim et al., 2019). They also attract talent as well as investments (Cambra-Fierro et al., 2023). However, rapid urbanization poses various risks to sustainability, including unemployment, social inequality and pollution (Liu et al., 2021; Camboim et al., 2019; Chu et al., 2022).

Cities globally have promoted Urban Innovation Ecosystems (UIEs) as a catalyst for regional socioeconomic development (Andion, Alperstedt & Graeff, 2020; Compagnucci et al., 2021). In this context, the role of open innovation has been emphasized, encouraging companies to actively integrate external ideas and knowledge into their solution development processes. UIEs are crucial due to their potential to generate wealth, jobs, and technological development. (Chesbrough, 2003).

Recently, the discourse on UIEs has evolved to include a wide array of stakeholders, spanning public, private, and third-sector organizations. This expanded view also includes research and development (R&D) entities, educational institutions, and the community, the non-conventional innovators, as co-creators (Äyväri, 2021; Bogers et al., 2010). The inclusion of different stakeholders ensures diverse perspectives, making innovations socially robust and inclusive (Arnkil et al, 2014). The importance of fostering these connections and partnerships among all stakeholders is strongly emphasized and the success of the UIEs has claimed to depend on their interplay and the relational resources generated (UNIDO, 2019; Gazaro dos Santos et al., 2022). Managing innovation process is inherently challenging, especially within diverse UIEs (Reypens, Lievens & Blazevic, 2019). Therefore, it is crucial to define the best model for managing these complex networks of diverse stakeholders (Lumineau & Oliveira, 2018).

The literature has explored the role of innovation intermediaries in facilitating cooperation, focusing predominantly on organizational dimension (Howells, 2006; Kivimaa, 2014; Stewart & Hyysalo, 2008; Matchoss & Heiskanen, 2017). However, this perspective has overlooked the growing involvement of communities in innovation processes, despite their increasing

participation (Äyväri, 2021; Randhawa et al., 2016). Furthermore, practical challenges related to community participation in urban living labs (ULLs) – experimental environments where intermediaries facilitate cooperation – remain understudied (Hossain et al., 2019; Menny et al., 2018). Additionally, the role of intermediaries in fostering such participation requires further research (Matschoss & Heiskanen, 2017). While there is a broad consensus on the importance of community participation in policy planning and decision-making processes, it often is a real challenge to put into practice. (Luoma et al., n.d.).

Given the pivotal role intermediaries play in UIEs by facilitating cooperation and participation, and acknowledging the existing research gaps, my aim in this thesis is to comprehensively investigate the community participation methods employed by Forum Virium Helsinki (FVH) – the City of Helsinki's innovation company – in its open innovation projects. FVH serves as a crucial urban innovation intermediary in Helsinki, acting as a bridge between businesses, academia, the public sector as well as the communities. By researching FVH's approach to community participation, I seek to analyse the specific methods and tools FVH utilizes to generate participation. Furthermore, I also aim to delve into the underlying community participation objectives FVH has as an innovation intermediary and how these objectives are achieved through their chosen participatory approaches.

My aim in this thesis is to contribute to a deeper understanding of how intermediaries can effectively facilitate cooperation and participation in urban innovation processes, to create more inclusive and sustainable cities. My research questions summarizing the research aim and guiding this study are as follows:

1. What types of community participation methods does the innovation intermediary FVH employ to facilitate community participation in its open innovation projects?

2. What are the primary objectives of FVH regarding community participation in its open innovation projects, and how are these objectives accomplished?

3. What are the key drivers and barriers to community participation in open innovation projects of FVH?

My analysis aims to uncover similarities, differences, and emerging themes among the projects of FVH to provide insights into effective community participation practices.

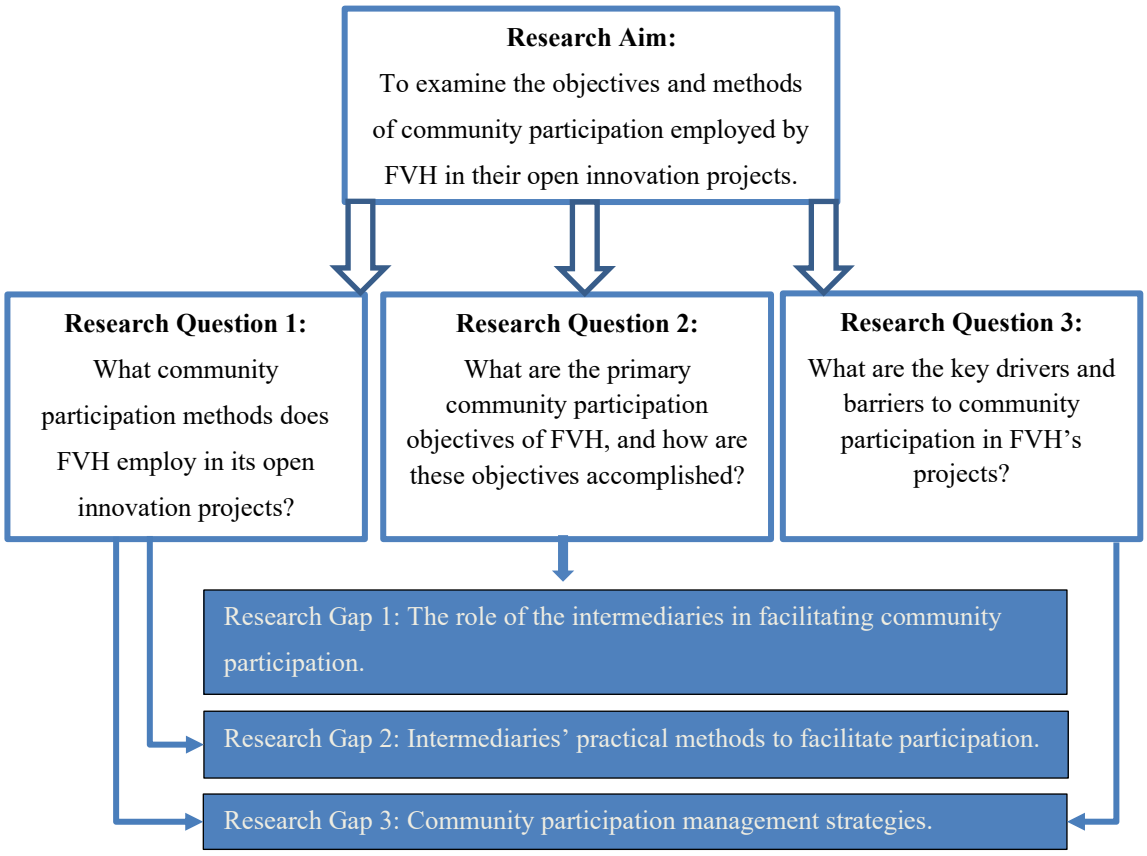

Figure 1. Interdependence of research gaps and research questions

To address my research questions, a comprehensive examination of FVH's project library is necessary. I will conduct a comparative analysis of multiple case studies within this library, utilizing a systematic framework to identify those participatory elements or combinations of the elements that have an impact on specific outcomes (Chess, 2000). A consistent and coherent description of these processes within various empirical situations is crucial to making analytical comparisons (Hassenforder et al., 2015).

The rest of my thesis is organized into five chapters. I will begin with defining the main theoretical framework, encompassing an exploration of previous academic contributions and research on the topic. Subsequently, I will open my research methodology in detail, including the research tradition, methodology, and data collection and analysis strategies.

Thereafter, I will present the context of this study, encompassing an overview of Helsinki and specific areas under investigation and a profile of FVH itself. Chapter five delves into the findings of the case study, and finally, I will conclude my thesis by answering the research questions and outlining possible themes for future research.

2 Facilitating Urban Innovation Ecosystems

This theoretical framework chapter lays the groundwork for my thesis, focusing on urban innovation ecosystems in relation to community participation. In the first half of it, I explore open and inclusive innovation and the role of intermediaries in facilitating participation. In the second half, I introduce a categorization of community participation and examine how participation intertwines with each stage of the innovation process.

2.1 Urban Innovation Ecosystem

Urban Innovation Ecosystems (UIEs) have gained greater significance in the literature and among policymakers due to their potential to foster innovation through multi-stakeholder collaboration. Stakeholders include, for example, companies, research centres, governments, and the community (Appio et al., 2018).

The concept of the innovation ecosystem has been defined by Granstrand and Holgersson (2020) as a collection of evolving relationships, actors, institutions, activities, and products. These various actors have a common objective to bring out new innovations through exploring knowledge and utilizing the strengths of the interactive ecosystem (Valkokari, 2015). Consequently, urban innovation ecosystems (UIE) refer to similar interactive networks within certain geographical areas (Guo et al., 2023).

These various interdependent actors have their own technical, social, economic, and political interests, yet they all operate in the same geographical area and move towards converging goals, priorities, and expectations while at the same time cooperating and competing (Santos et al., 2021). UIEs are constantly evolving as urban areas evolve (Spinosa & Balbinot, 2022).

To excel in science, technology, and innovation, countries and cities must move beyond traditional models and create that type of a dynamic environment that fosters collaboration across sectors and various actors to support innovation (Spinosa & Balbinot, 2022). Developing new knowledge requires a structured approach that enables participants to identify future opportunities and create innovative solutions. At the same time, utilizing this knowledge includes collaborative and competitive activities in delivering solutions to customers. These aspects require different alignment and strategies, making ecosystem coordination a challenge – especially as the actors within an ecosystem are not governed hierarchically (Sorri & al., 2024). A key challenge related to UIEs is determining effective

solutions for their structure referring to their creation, induction, and management. (Spinosa & Balbinot, 2022).

UIEs serve as a crucial tool for urban areas heading towards smart cities, referring to the integration of technology and knowledge creation into urban infrastructures, culture, society, and governance to enhance well-being and performance (Dameri, 2015).

Although the dynamic evolution of UIEs is important to the city from social and economic point of view, they face several common critiques. These critiques include for example a lack inclusivity, which is addressed later in this chapter. Additionally, lack of appropriate governance arrangements may lead to inefficiencies or conflicts (Ruhlandt, 2018). Power dynamics are often imbalanced, with large parties, such as corporations, dominating decision-making. Furthermore, some sustainability challenges may arise, as innovation development tends to focus on economic growth and technological advancement over broader sustainability impact (Jiang et al., 2022).

2.1.1 Open Innovation

According to the widely quoted definition by Damanpour (1996, 684), innovation is a means to change an organization, and it can be a reaction to external changes or a proactive measure to shape the environment. Schumpeter remains the most influential scholar in the field (Fagerberg et al., 2012) and defines innovation as a process of "setting up a new production function" (Schumpeter, 1939, 87), implying that any changes in economic elements, related to a product, a production process or a market, need an innovation process (Schumpeter, 1934).

Broadly defined, innovation includes various forms, encompassing new products or services, advancements in process technology, new organizational structures or administrative systems, and the implementation and adoption of new plans or programs. Innovations do not necessarily have to be entirely original but can only involve modifications to existing products or services. An invention only becomes innovation when it is successfully implemented and applied within the market or society. (Jauhiainen & Hooli, 2019).

Since the late 20th century, there has been an emergence of new terminologies explaining various aspects and processes of innovation (Jauhiainen & Hooli, 2019). New governance structures (see list Fuglsang & Hansen, 2022, 1) that challenge traditional top-down, internally driven innovation have reframed public innovation activities and entail new types

of collaborative, interactive, and open innovation (Fuglsang & Hansen, 2022; Hartley, 2005). Many of these new governance models are being tested in cities, for example in urban living labs (Voytenko et al., 2016).

The concept of open innovation (OI) has originally emerged in the private sector (Gasco-Hernandez et al., 2017; Pedersen, 2020) where it serves as a model for organizations to open their innovation processes to benefit internally, as well as externally developed ideas and know-how (Chesbrough, 2004). Later studies have examined how firms can collaborate with users beyond the collaboration within and between firms (Schuurman et al., 2013). Moreover, the emphasis on the need to open innovation processes to the community has grown, reflecting a broader recognition of the value of community input (Serra, 2014). Practically, OI means breaking down traditional silos and collaborating with various partners to come up with new ideas.

This approach recognizes that many challenges are too complicated for a single actor to solve alone, thereby highlighting collaboration and knowledge sharing among various stakeholders (Sørensen & Torfing, 2011). OI has the potential to accelerate innovation, create value, and expand markets by leveraging external ideas and pathways (Chesbrough, 2004). However, this approach has its challenges. These challenges overlap with challenges related UIEs but manifest differently. Knowledge exchange and collaboration may be hindered due to for example power imbalances, issues with resources, and intellectual property rights. (West & Bogers, 2014).

Within public sector, implementing open innovation methodologies has showed to have various advantages, ranging from enhanced awareness of social problems, and increased trust between stakeholders, to enhanced practices based on comprehensive community experience (Gasco-Hernandez et al., 2017).

2.1.2 Inclusive Innovation

While innovations address problems and fulfil unmet needs, they can also foster exclusion, particularly amongst people with low socioeconomic status. The benefits of innovation are often distributed unequally, with a risk that corporate interests dominate innovation rather than the community needs. (Chataway et al., 2014). These needs differ, as community needs are often focused on collective well-being and social equity as well as access to essential services, while corporate needs prioritize profit and market share. (Porter & Kramer, 2011).

Social innovation research has shown that participatory approaches can effectively identify and tackle the needs of marginalized communities (Bhatt et al., 2016). Literature on responsible innovation highlights the role of open innovation as a key principle in fostering inclusion (Stilgoe et al., 2013), as open innovation enhances access for diverse perspectives, increases transparency, and creates opportunities for collaboration, knowledge-sharing, and resource-sharing among various stakeholders.

In this context, 'inclusive innovation' has become a prominent concept among researchers and policymakers. Moreover, there is an increasing need for innovation strategies to integrate more comprehensive inclusion and social policy goals (see e.g. Uyarra et al., 2019) to address inequalities, environmental and social challenges, and the demand for public value creation. Furthermore, there has been a worldwide trend to devolution and interest to enhance innovation strategies in the subnational level (see McCann & Ortega-Argilés, 2013) and growing distress that benefits of innovation are rather concentrated than spread (Feldman et al., 2021). That fact has partly affected many cities to integrate inclusive innovation to their economic development strategies (Lee, 2023).

The article by Neil Lee (2023) provides a comprehensive analysis of inclusive innovation in cities. The emphasis is strongly on the importance of enabling participation of marginalized groups, and those excluded from the mainstream, in innovation projects to ensure equitable influence of innovation. Stanley et al. (2018) highlight that democratic and participatory approach in governance and priority-setting is crucial. Furthermore, there should be innovation for and by marginalized groups, necessitating active participation beyond mere presence. This touches upon diverse classes and groups.

Policies must actively consider how to give excluded groups a greater voice, and whose needs are and are not met by innovation (Stanley et al., 2018). Lee suggests that innovation should aim to empower and enable people at the periphery through increased awareness, accessibility and democratic deliberations, rather than pursuing only economic outcomes. The overarching message is the increasing need to incorporate innovation strategies with more comprehensive inclusion and social policy goals (Lee, 2023).

2.1.3 Innovation Intermediaries and Their Role in Innovation Management

Innovation intermediaries can be defined as external individuals or organizations that facilitate companies' innovative activities by providing opportunities for knowledge and

know-how transfer between stakeholders. (Bakici et al., 2013; Howells, 2006). Beyond their role in supporting companies' innovation, innovation intermediaries can also facilitate innovation among a broader range of stakeholders by enabling knowledge and know-how transfer. Intermediaries can create platforms and networks to enable cooperation and mutual learning between various stakeholders. (Stewart & Hyysalo, 2008).

Intermediaries can operate either as agents, representing one side, or as brokers, representing different actors of the innovative transaction (Chesbrough, 2004). Within urban context, innovation intermediaries' main aim is to bring together firms, universities, research institutes and other organizations to innovate (Kivimaa et al., 2019; Bakici et al., 2013). For example, innovation intermediaries can organize networking events and workshops promoting collaboration for advanced resource exchange (Howells, 2006).

Studies about innovation intermediaries go back to the early 2000s at the latest (Howells, 2006; Stewart and Hyysalo, 2008). However, while the number of studies on innovation intermediaries have increased, the common understanding of their actual purpose and characteristics has become multifaceted (Caloffi et al., 2023; Äyväri, 2021). This is caused by the variety of perspectives and terms, such as brokers, matchmakers, and orchestrators used to describe them. This has made difficult discerning patterns, as key intermediary types or activities. (Caloffi et al., 2023). Possible intermediary actors include global platform companies, large corporations, start-ups, research organizations and establishments in private and public sectors, like cities and government agencies. (Kola et al., 2020).

Äyväri (2021) divides innovation intermediaries (Äyväri uses the term "orchestrator") into three categories based on their characteristics and motivations: a player-intermediary, a non-player intermediary, and a non-player enabler intermediary. A player-intermediary aims to reach its own business goals and enhance its competitive edge. A non-player intermediary, instead, aims to achieve its long-term business objectives without competing in the same market as its network members. (Äyväri, 2021). A non-player enabler intermediary, that I will focus on in this thesis, operates without vested business interests (Hurmelinna-Laukkanen & Nätti, 2018), and aims for the well-being of innovation ecosystem and seamless cooperation among stakeholders (Pikkarainen et al., 2017). These intermediaries assist stakeholders in identifying new business opportunities and social innovation needs through its own actions, while also facilitating experimental learning in multi-actor innovation processes. Cities,

universities or third-sector organizations can serve as a non-player enabler intermediary (Äyväri, 2021).

Given the characteristics of Forum Virium Helsinki, it can be recognized as an innovation intermediary, and more specifically as a broker, as it effectively facilitates collaboration between various stakeholders. Moreover, it fits under the concept of non-player enabler intermediary, prioritizing the urban innovation landscape over profit-making.

2.1.4 Urban Living Labs

Living Labs (LLs) have been under discussion across various fields of innovation studies, resulting in a lack of common understanding of their definition and use (Veeckman et al., 2013; Leminen & Westerlund, 2016). European Network of Living Labs (ENoLL) have defined LLs as "open innovation ecosystems in real-life environments using iterative feedback processes throughout a lifecycle approach of an innovation to create sustainable impact" (European Network of Living Labs, 2024). Despite some ambiguity in the concept, LLs are generally understood as sites for designing, testing, and learning from innovation in real time. (Menny et al., 2018). The European commission has promoted community participation in innovation processes (European Commission, 2013), and views LLs as a key tool to achieve this goal (Leminen et al., 2017).

LLs operate as networks that combine open innovation with user-centred research (Leminen et al., 2012). Their purpose is to align innovation processes closer to user preferences and practices, thereby enhancing acceptance and minimizing risks of failure. Additionally, LLs encourage cooperation, uncover unexpected applications, and identify potential business models and implementation effects. (Ståhlbröst, 2012). LLs facilitate collaborative learning and address the real needs of users, making it a practical method for enhancing sustainability within urban areas (Van Geenhuizen, 2019). Moreover, research has proven that LLs can actively engage the community when fostering co-creation towards more sustainable environment (Compagnucci et al., 2021).

Consequently, Urban Living Labs (ULL) represent an application of the living lab concept, focusing on innovation within urban areas. ULLs are one of the key approaches for intermediaries to foster urban innovation as they serve as dynamic spaces (Federley, 2014) where the community and diverse stakeholders are integrated to develop and test ideas, solutions, and systems in authentic, real-life environments (Menny et al., 2018). Through

linking various stakeholders, ULLs are critical forces developing urban innovation ecosystems (Gasco-Hernandez et al., 2017). Community participation is at the heart of their operation and success (Menny et al., 2018). This approach seamlessly intertwines with people's everyday lives narrowing the gap between development and research.

ULLs make use of various co-design methods to obtain a better understanding of the needs of the participants and to come up with innovative solutions or ideas. These methods are used to generate participation in both decision-making process and taking an action. The key to success is the early and sustained participation of the afflicted people, clear expectations and goals, as well as preferring action over discussion (Friedrich et al., 2014).

2.2 Community Participation

In this study, I define the community as non-conventional innovators, such as citizens or residents (Schot et al., 2016), along with their associations and non-governmental organizations (NGOs) (Kuhlmann and Rip, 2014), excluding conventional innovators like industry and knowledge institutes.

It is also important to define the concept of "user" in the context of open innovation. Primarily, the term user is being used as the end beneficiary. Nyström et al. (2014) categorize users as informants, testers, contributors and co-creators.

Within urban environment, the users mostly refer to local residents but can also include professional users, employees, organizations and others. (Arnkil et al., 2010). In this study, however, users will be considered as part of the community.

Eason (1987) differentiates users into three categories: 1) primary users, who are active engagers of the system; 2) secondary users, who access the system mostly through an intermediary; 3) tertiary users, who affect or are affected by the system. Simpler, one can only differentiate users from non-users, non-users choosing to restrict or partially avoid using certain products or services (Selwyn, 2003). Furthermore, users can be divided into lead users and ordinary users. Lead user is at the forefront of an important market and is experiencing needs, that others experience later in the same market. (Arnkil et al., 2014).

Participation can be understood as the process or single activities of consulting and including relevant stakeholders. They are engaged in setting agendas, making decisions, and establishing policies, within organizations or institutions that are responsible for policy

development (Rowe & Frewer, 2004). In the context of innovation, community participation is an inclusive process that enables the community to take part in the decision-making process in research and innovation (R&I) projects (Newig & Kvarda, 2012; Rowe and Frewer, 2000). Related level of participation varies depending on the participants' will to participate and the extent to which facilitators are prepared to involve them (Arnkil et al., 2010).

2.2.1 Community Participation Methods

Within this study, community participation methods refer to all the ways, including methodology, activities and tools, intermediaries use to foster community participation in their open innovation projects. Participation has a long history, and its methods have developed into a diverse set of instruments enabling different levels of involvement and participation. Methods include for example surveys, focus groups, public meetings, workshops, assemblies, voting and polling for the community (Fischer, 2012).

During the past decennia, new communication technologies and media have created new possibilities for participation, such as crowdsourcing, participatory budgeting, or online petitions. Participation is increasingly facilitated by digital technology in Finland. While they serve as a valuable tool for more efficient participation, they may also raise barriers which may result in participation inequalities. (IMEC et al., 2021). In this context, it is crucial to ensure accessibility, autonomy, and critical thinking in digital participation.

Citizen Science (CS) serves as an emerging tool, which holds a great potential to foster community participation in scientific research for policy informing. It can be used as one of the approaches in ULLs, where various stakeholders including the community are engaged in data collection and innovation. (Veeckman & Temmerman, 2021).

Nowadays, citizen scientist is provided with modern technologies, like sensors or applications, by a professional scientist. The level of participation within CS varies in degrees and stages of the process. CS projects can be separated into three categories: 1) contributory, where community collects data; 2) collaborative, that includes also the analysis and help on disseminating results; 3) co-created, where the project is designed in collaboration with the community and scientists all the way through the process. (Bonney et al., 2009).

Even though the main purpose of CS is to be a tool for data collection and scientific knowledge and awareness gain, it is also recognized as a powerful tool to include in decision-making processes and governance (Göbel et al., 2019).

During recent years, CS has gained a lot of attention as a method for collecting environmental data as well as for increasing community participation and environmental assessment and awareness. (Luoma et al., n.d., 21). At the same time, this approach may lack empowerment for participants and often fails to give any influence to those involved or affected (Fagerholm et al., 2021).

2.2.2 Categorization of Participation

Evaluation of participation is a widely discussed topic within literature, starting from crucial contributions like Ladder of Citizen Participation (1969) by Sherry Arnstein with its eight levels of citizen empowerment varying from non-participation to citizen control. Even though the ladder advocates that the aim is to reach for the highest level of participation, it is largely questioned in literature (see for example Davidson, 1998).

Thus, Davidson suggests replacing the ladder with a wheel to prevent the suggestion of aiming high in the ladder. As Menny et al. 2018 state, varying participation at different stages of an innovation project can significantly impact the success of outcomes when it comes to ULLs and that varying contexts require varying levels of participation. Therefore, it is necessary to analyse the level of participation generated at each stage of the innovation project.

There are numerous ways and degrees, in which community is able to participate in open innovation projects. They can vary from indirect ways to more direct types of participation. Indirect ways may involve activities, like filling out a survey and direct ways can include participating in the development process of new services alongside R&D experts. (Arnkil et al., 2014).

One simple and practical method to differentiate community participation is the division into three categories based on user involvement: for, with and by users (Bekker and Long, 2000; Eason, 1987; Kaulio, 1998) (Summarized by Ståhlbörst, 2008; Arnkil et al., 2014):

1. *Design for users*, refers to that solutions is developed on behalf of the user and users are involved late in the innovation process to validate prototypes and requirement specifications (Ståhlbörst, 2008).

2. *Design with users*, refers to an approach of product development. Like in the previous category, the focus is on users' preferences, wishes, and needs as in the previous

category but adds the demonstration of various solutions for users to react. In this category, the users are engaged throughout the process. While the user is active and responsible for evaluation activities and context, the designer is responsible for development activities and design. (Arnkil et al., 2014).

3. *Design by users*, means that users are actively participating in the planning of their own product. Users are driving the process themselves. The designer acts as a facilitator, deciding over large ways. (Ståhlbröst, 2008).

Due to this model's practicality and simplicity, it is very applicable to various innovation settings and it has been used for guidance and evaluation of participation in ULLs as well.

More specific and detailed model, focused in ULLs, developed by Menny et al. (2018), separates four different levels of participation:

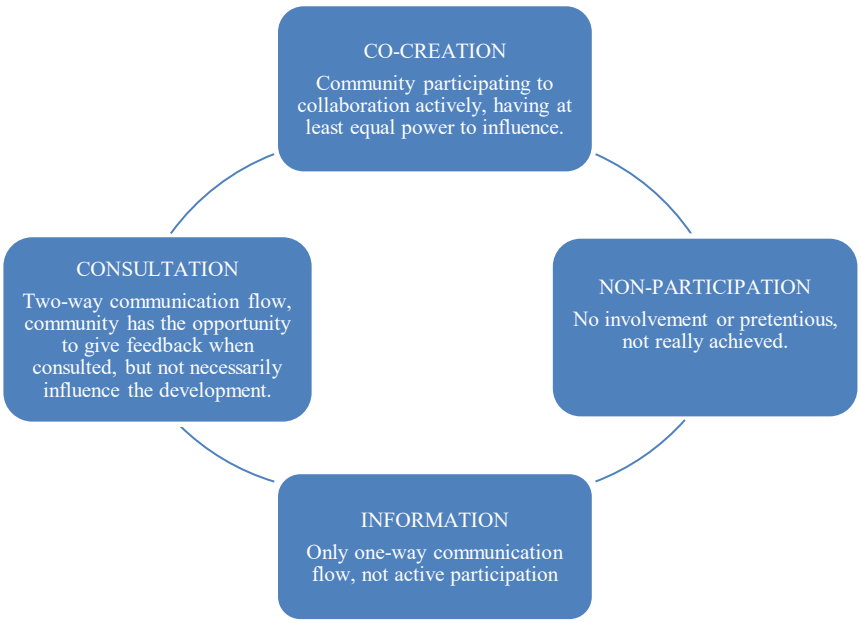

Figure 2. Levels of user participation (adapted from Menny et al., 2018)

Although co-creation is viewed as a critical component in ULLs and high participation levels are recommended to fully leverage its potential, it cannot be seen as the only suitable level of participation. The focus, nature of the project, and different project stages must be considered, and co-creation may not always be required. Therefore, fostering 'less engaged' levels of participation might also be necessary. (Menny, 2016; Menny et al., 2018). In reality, co-creation is often challenging and sometimes impractical.

2.2.3 Different Stages of the Innovation Project and Related Participation

To be able to analyse the level of participation occurred within the innovation timeline, it is necessary to identify the different stages of the open innovation project. Federley et al. (2014) identify three distinct stages within ULL projects:

1. *Design*, which encompasses understanding the context as well as design and development of activities;
2. *Implementation,* where ideas are put into practice; and
3. *Evaluation*, where learning is achieved and the outcomes are improved (Federley et al., 2014).

From these stages, the implementation stage usually receives the most emphasis and resources for participation, as it is central to the project. Moreover, having a smaller group of users makes generating co-creation within the implementation stage more straightforward. This is also reflected in the literature, where the highest levels of participation have indeed been observed during the implementation stage (see e.g. Almirall et al., 2012). For the other two stages, design and evaluation, participation has been noted to stay between non-participation and consultation (Menny et al., 2018).

Stages identified by Fedeley et al. overlap and may not be very distinguishable due to the nature of ULL's iterating process (Menny et al., 2016). A more nuanced process model is presented by Almirall et al. (2012) including following stages:

1. *Contextualization*, which encompasses focus building through scenarios and grounding the project through stakeholder identification and approach;
2. *Concretization*, where solutions and prototypes are developed interactively and iteratively;
3. *Implementation*, that involves trialling, testing and appropriation; and
4. *Evaluation*, where learnings are generated.

This categorization provides more clarity into the design phase of the process as contextualization and concretization are separated into two very distinguished stages.

Reviewing literature on open innovation process in general, the most used approaches involve three steps:

1. *Idea generation*, where ideas are collected and generated
2. *Development*, where ideas are developed and specified
3. *Commercialisation*, where value creation occur by transforming ideas into products. (Vaisnore & Petraite, 2011).

For this study, the process model presented by Almirall et al. (2012) is used, as it clearly details stages that align well with Forum Virium Helsinki's open innovation projects.

There is a lack of practical research focusing on the different levels of participation and how they are organized by intermediaries. Some studies have identified lists of participatory methods within ULLs, however analysis of what level of participation they generate is lacking, even though it is relevant information for intermediaries in their attempts to foster successful cooperation between various stakeholders.

2.2.4 Comparison of Participatory Processes

The findings of my thesis are structured according to the COPP (Comparison of Participatory Processes) framework by Hassenforder et al. (2015). This framework provides a theoretical basis for describing and comparing participatory processes, and is particularly useful for observing and evaluating both processes and their outcomes (Veeckman & Temmerman, 2021) in diverse cases, themes, and methods. Moreover, a systematic framework that provides clear guidelines for the description of the processes across various combinations of empirical situations is essential for analytical comparisons (Hassenforder et al., 2015).

This framework is not intended to be used alone but serves as a tool for cross-comparison, aiming to inspect the effectiveness of participatory processes and their specific elements. Following this cross-comparison and an in-depth analysis of specific cases is necessary to comprehensively study participatory processes. These two approaches are complementary. (Hassenforder et al., 2015).

There are plenty of participatory processes evaluation frameworks aiming to understand similar elements with different approaches. Usually, the focus is on the process and its outcomes, while this framework also considers the context dimensions. The COPP framework

serves as a handy tool to be used across diverse context, methods and disciplines. (Hassenforder et al., 2015).

COPP framework aims to generalize the assessment of such processes by integrating variables from diverse contexts, facilitating the comparison. It consists of three assessment dimensions, synthesized from literature-based insights: 1) context, 2) process, and 3) outputs, outcomes, and impacts. (Hassenforder et al., 2015).

Although this framework provides selectable options for each variable, I have adapted it to accommodate open-ended variables for more flexible and nuanced analysis. Involving few selectable options neglects the contextual richness through strong simplification. However, some simplifications need to be done in order to facilitate the analysis.

As the scope of this study does not encompass the perspectives of the community, I have adapted the framework to focus solely on variables related to the organizational perspective. Furthermore, variables related to the characteristics of the organizer, which remains consistent throughout the projects, are also excluded. Lastly, due to the multi-year duration of the studied projects, variables like “number of events” or “degree of participation retention”, are not relevant.

The Context Dimension

There are several researchers (see list Hassenforder et al., 2015, 7) who claim that implementing a specific participatory process method may steer into different outcomes depending on the context. The reason for this might be that certain methods are not effective across all contexts or that some process steps affect dynamics differently (Hassenforder et al., 2015).

Firstly, *timing and the locations* of each studied project are presented. Although these aspects are not explicitly part of the framework, they are introduced for the clarity and comprehensive understanding of each project. The first official variable of the context dimension is the “*target system elements*” as it allows to understand the elements that process is headed at (Hassenforder et al., 2015). Within FVH’s projects, these elements encompass a wide array of themes, from smart mobility to green infrastructure and air quality.

The next variable is defined as “*other past/present intervention attempts*” to distinguish contexts with plural innovation projects already implemented from contexts with only a few

or no other similar experience (see list Hassenforder et al., 2015, 9). This is a crucial aspect in my study as the investigated areas have different amounts of previous innovation attempts.

Related to other intervention attempts, many scholars have highlighted the importance of "*pre-existing relationships among participants*" as a key factor influencing participation. Some refer to this social context broadly, while others point to variables like conflict and mistrust, which might hinder the participation (see list Hassenforder et al., 2015, 9).

The Participatory Process Dimension

Variables in the dimension are mostly derived from the key stages of participatory process design and essential elements used in detailed descriptions of specific processes. (Hassenforder et al., 2015).

The first variable, "*participatory process objectives*", has been identified as a significant one by many scholars (see list Hassenforder et al., 2015, 10–11). The variable considers official participatory process objectives, such as improving community understanding or gathering knowledge (Hassenforder et al., 2015).

The "*selection of the participants*", adapted by Hassenforder et al. (2015) from Fung (2003, 2006), is often introduced in other frameworks as "representativeness" of participants (see list Hassenforder et al., 2015, 12). However, in this study, the selection process may not pursue a representative sample of participants; hence, the variable "selection of the participants" is suitable. Related to the previous variable, another variable "*size of the group*" is defined as the number of participants involved and is identified by various authors (see list Hassenforder et al., 2015, 12).

Next, "*degree of participation*" is presented as one of the key aspects addressed in the literature to describe the participation process (Hassenforder et al., 2015). In this study, the previously presented categorization by Menny et al. (2018), is used as selectable options.

The final variable is the participatory "*methods and tools*" employed to foster participation throughout the project.

The Outputs, Outcomes, and Impacts Dimension

There are a variety of potential outputs, outcomes and impacts of participatory processes, encompassing short and long term, tangible and intangible, environmental, or social effects. Outputs refer to the immediate products of the process, outcomes to its broader effects, and impacts to the extent to which the process contributes to achieving the goals of the target elements (adapted from Young, 2008). While the COPP framework, like this study, aims to identify the major changes resulting from participatory processes, it does not seek to detail every possible effect. This study focuses specifically on immediate outputs and the impact on actions implemented by the community.

However, it is necessary to recognize that the scope of this study is limited to materials provided by the organization fostering participation and only to materials collected immediately after the process. Therefore, longer-term outcomes, are limited out. The only exception to this limitation is the data gathered through interviews, which were conducted after the completion of the project.

The first variable of this dimension, "*main outputs*", is described in relation to the objectives of the participatory process. This variable encompasses the immediate and tangible products of the process, which are easy to observe once the process has concluded.

"*Impact on actions implemented by participants*" is highlighted as an important variable by Innes & Booher (1999). This could refer to behavioural changes within the community or collective actions taken as a result of the participatory process.

Although not part of the original COPP framework, this study also identifies *challenges* and *drivers* related to community participation in each project. These elements are important for a comprehensive understanding of the participatory processes. Challenges refer to the obstacles encountered, while drivers to the factors that fostered the participation.

3 Research Data and Methodology

This chapter provides a backbone for the thesis, outlining the approach to conduct the study. It begins by laying out the research tradition employed, followed by a comprehensive presentation of the research methodology. Subsequently, the chapter delves into the data collection and analysis methods making the research process clear and accessible.

3.1 Research Tradition

This study utilizes case study research as research tradition to analyse and understand the complexity surrounding the implementation of community participatory processes within the urban innovation ecosystem. As Dubois and Gadde stated in 2002: '*the interaction between a phenomenon and its context is best understood through in-depth case studies*'. The focus lies on understanding how communities participate in open innovation processes and why their participation is beneficial for innovation development.

When analysing a case study, it is necessary to understand the contribution the case offers and why analysing the case is significant. Using a case study as an example is advantageous when studying a complex topic such as the urban innovation ecosystem. Merely exploring and identifying participation processes is insufficient. It is crucial to reflect against a strong theoretical foundation regarding the community's role in open innovation projects. It must be recognized that all the conclusions drawn from one city are not applicable in another city.

The goal of using a case study is to provide a detailed and holistic understanding about the examined phenomena (Eriksson & Kovalainen, 2008). This approach requires thorough analysis of comprehensive empirical material (Tellis, 1997).

The research processes are argued to be always incomplete, dynamic and continuously changing and therefore posing a challenge to conduct empirical analyses using any strategy. Furthermore, within empirical research, it is essential to determine units of analysis in order to represent internal consistency and coherence (Ibert, Hautala & Jauhiainen, 2015).

3.2 Research Methodology

This study applies a qualitative research method, since I explore and explain complex social phenomena in naturalistic, real-world setting, where the phenomena naturally occur. Qualitative research seeks to understand and find meaning but also gain new insights.

(Stewart-Withers et al., 2016). Qualitative study is effective when exploring people's attitudes, behaviours, motivations or lifestyle (Marshall & Rossman, 2006). As my research questions are descriptive questions, aiming to understand real-life participation, the qualitative approach is justified.

It is necessary to acknowledge my own position as a researcher that may influence in the way the data is interpreted (Sultana, 2007, 376), therefore the research will provide only a limited image of the social world. In order to be a good researcher, it is necessary to also be aware of the position in relation to the research context. Research process requires continuous critical eye. (Stewart-Withers et al., 2016).

A way for researcher to produce reliable results is using research triangulation (Bans-Akutey & Tiimub, 2021). It is a process that increases the validity and credibility of the research (Noble and Heale, 2019). Triangulation involves using multiple approaches to drawing out the needed information and analysing the findings critically (Social Sciences Research Laboratories, 2018). Furthermore, triangulation is crucial for generalizing the subjectivity of the qualitative analyses (Philip, 1998). Validity informs how close the findings are to the real values under examination and how correctly chosen approach measures (Noble and Heale, 2019). In order to correctly use and interpret findings for making informed decisions, validity has to be achieved (Golafshani, 2003).

In this study, I employ two types of triangulations: methodological and data triangulation. Methodological triangulation employs more than one research method or approach (Casey & Murphy, 2009). In my study, this involves analysing open innovation projects using various types of written materials combined with semi-structured interviews. This approach enhances the confirmation, credibility and validity of the findings, while also providing a deeper understanding of the concept under study (Casey & Murphy, 2009; Halcomb & Andrews, 2005). Fundamentally, different approaches are seen as supplementing one another rather than being separate entities (Stake, 2005).

On the other hand, data triangulation uses several data sources (Bans-Akutey & Tiimub, 2021). I make use of content analysis, such as project reports, self-evaluations, publications and to enhance the depth of my analysis, I employ semi-structured interviews with project coordinators responsible.

The research process, especially a qualitative one, is not strictly linear. While the main methods remain consistent, data sources and more detailed approaches may evolve and adapt along the way. This flexibility allows for a deeper exploration of the research area, fostering new insights and understanding. New findings from data analysis may affect to used documents or interview structure for content analysis. This approach enhances the overall rigor and richness of the research. (Maxwell, 2013).

3.3 Data Collection

3.3.1 Criteria and procedures for project selection

As my research focuses on finished open innovation projects employed by Forum Virium Helsinki, it is necessary to establish specific criteria for including and excluding projects from the scope of the study. FVH's 'project library' database contains records of 175 projects, of which 144 are completed and closed. The cases are chosen from completed projects as this allows collecting and analysing data from all the stages of the project lifetime.

However, these projects undergo filters assessing the objectives regarding community participation. FVH's projects can be divided into two categories on their approach: technical projects, which do not require input from the community, and social projects, which require the input and validation of the community through experimentation and feedback (personal communications in FVH). Therefore, projects that do not clearly state their attempts to enhance or utilize community participation within the project will be excluded. Furthermore, projects that cancelled their community participation activities due to the COVID-19 pandemic will also be excluded from the scope of this study.

After applying this filtration, seven projects were selected for the scope of this study and are subject to detailed comparison and analysis. This selection provides diverse approaches and distinct insights into the different roles of the community within open innovation projects in Helsinki.

3.3.2 Written material

Written materials include published documents, comprising both general guidelines derived from the project and more detailed documents that elaborate the project itself, alongside project reports and self-evaluations found in the FVH project library.

As the initial project material, I used the self-evaluations that are reported once the project finishes. Self-evaluations include information on the objectives of the project, the starting state before the project, the project's accomplishments, why some objectives were not reached, the project's added value or effects, continuation of the project (scaling, permeation, etc.), realization of the key performance indicators (KPIs), evaluation of collaboration between FVH and partners, methodologies used, their effectiveness, and their evolution during the project as well as lessons learned for the future.

Self-evaluations usually include some attached files, for example, publications, conclusions, information on KPIs, or reports and documentation. Reports may entail documentation on engagement activities, project journals, project handbooks, mid-term reports as well as final reports.

The quantity of materials varies for every project as they vary in their size and funding sources, thus leading to various levels of reporting requirements. Furthermore, the quality of the reporting also varies. Other written materials found online contributes to the triangulation, such as websites and published articles. This written data is complemented by interviews.

3.3.3 Interviews

For the interview component of my study, I employ semi-structured interviews with project experts of selected projects. As previously indicated, I make use of data triangulation, therefore the interview component serves as a valuable addition (Laine, Bamberg & Jokinen, 2007) to supplement previously gathered retrospective materials, which may lack coherence. Additionally, I ensure that appropriate measures are taken regarding the organization of the interviews. In qualitative research, an interview is seen as an interactive situation where the interviewer's influence on the provided material cannot be completely eliminated (Kallinen & Kinnunen, n.d.).

I organized five initial interviews to gain an overview of community participation within FVH and to gather general insights. These first interviews were also semi-structured, although maintaining a lower level of structure compared to the forthcoming project-specific interviews. Interviewees, chosen for their experience within FVH and with the community, included a senior project manager, a senior advisor, a communications specialist, a technical specialist, and a development manager. Each of these interviewees will receive a letter from A to E. These early conversations helped me understand the landscape and aim the focus in the

right direction. All the initial interviews were conducted in person or remotely and lasted 45 minutes to an hour.

Later, five more interviews were conducted, focusing on the experts of chosen projects – especially those that were challenging to grasp from written materials alone. These interviews were noticeably more structured than the initial interviews, as the project and community participation landscape within FVH had become more familiar. The themes discussed were the projects themselves, the objectives related to community participation, the methods used to achieve these goals, the results, and how participation affected achieving these. Additionally, we explored the challenges and drivers encountered, and overall benefits of participation.

Interviewed individuals, as project managers or planners, were able to offer essential insights and clarifications. More thorough descriptions of the interviewees are not essential, and the interviewees will stay anonymous in this study. Each project related interviewee will receive a number from 1 to 5 to denote the contributions. Altogether, ten interviews were conducted during the writing process of this thesis.

Table 1 Overview of the project related interviewees from 1 to 5

ID	Role	Date & Duration	Method & Location	Programme
Interviewee 1	Project Planner	Spring 2024, 45mins	Remotely, automatic transcription	Project under the smart city
Interviewee 2	Project Specialist	Spring 2024, 30mins	Remotely, own extensive notes	Project under the smart city
Interviewee 3	Project Manager	Spring 2024, 60mins	Remotely, own extensive notes	Two separate projects under the smart city
Interviewee 4	Project Manager	Spring 2024, 45mins	In-Person, own extensive notes	Data
Interviewee 5	Project Planner	Spring 2024, 45mins	In-Person, own extensive notes	Smart mobility

Interview notes were stored securely in accordance with data protection regulations in Excel spreadsheets for organization and analysis. It needs to be taken into consideration that these interviews were conducted from the perspective of project experts, who can only partially speak on behalf of other stakeholders.

3.4 Data Analysis

3.4.1 Analysis-driven Thematic Analysis

The material never speaks for itself, moreover the researcher speaks for it from a certain perspective. Therefore, regarding the data analysis, this study adopts an analysis-driven approach, that integrates inductive (material-driven) as well as deductive (theory-driven) perspectives. This approach implies that data is crucial, but when analysing it, the researcher relies on a paradigm, method or a theory. (Kallinen & Kinnunen, n.d.). This approach also allows the emergence of new insights from the materials.

In inductive approach, the starting point is the empirical material itself, and the results emerge from within, enabling comparison with prior research and theories (Kallinen & Kinnunen, n.d.). This approach acknowledges the complexity of the real-world phenomena and remains flexible for unexpected insights. By employing this approach, I am able to identify themes and connections that are not apparent elsewhere.

Conversely, in deductive approach, the analysis process is guided by established theories and concepts from the literature, providing a framework for understanding the data. This ensures that the findings are grounded not only on empirical materials but also on theoretical frameworks, enhancing the robustness of the research findings. (Kallinen & Kinnunen, n.d.).

This study involves a thematic analysis as described by Braun and Clarke (2006) of the case material. Thematic analysis refers to organizing empirical data to produce rich and detailed descriptions of key themes. It is a suitable method for researchers to identify, analyse, and interpret patterns of themes in qualitative data. Moreover, as it allows both the predefined theoretical considerations and material-driven insights, it is well-suited for exploring complex phenomena, like participation processes. I elaborate further how this approach was applied in the next chapter.

3.4.2 Data Review and Analysis Process

The analytic process involved multiple steps. Initially, to ensure a comprehensive overview of the research materials, I commence by reviewing the collected data, encompassing self-evaluations, reports, publications, deliverables, available feedback and interview transcripts from all ten interviews to gain a holistic understanding of the projects. This initial phase involved note-taking for dedicated project documents. This examination facilitated the

identification and analysis of common themes related to community participation aspects emerging from the dataset.

Following the review, I proceeded to systematically analyse the data, identifying potential interconnections, patterns, and trends. At this stage, I brought important aspects from each project to a common excel sheet to enable comparison. I coded the data using both inductive and deductive strategies, meaning that categories were not predefined, but analysis was guided by theoretical constructs.

Initial categories evolved into themes that eventually help me answer the research questions. By investigating the similarities as well as differences between participation methods and their corresponding stage of the innovation process, I aim to draw detailed insights into the dynamics of community participation.

Finally, I thoroughly interpret the findings reflected against the research questions and objectives. I examine how these discoveries enhance comprehension of the fundamental elements facilitating community participation. Building upon these conclusions, I will provide recommendations based on the insights gained regarding community participation in urban open innovation projects.

It needs to be acknowledged that a comprehensive coding structure and categorizations are specified only after thorough examination of the materials, rather than being determined beforehand. These codings, categories, and themes rise organically from the materials, thereby the researcher should not influence the analysis with too strong predetermination and exclusion of potential insights. (Kallinen & Kinnunen, 2021).

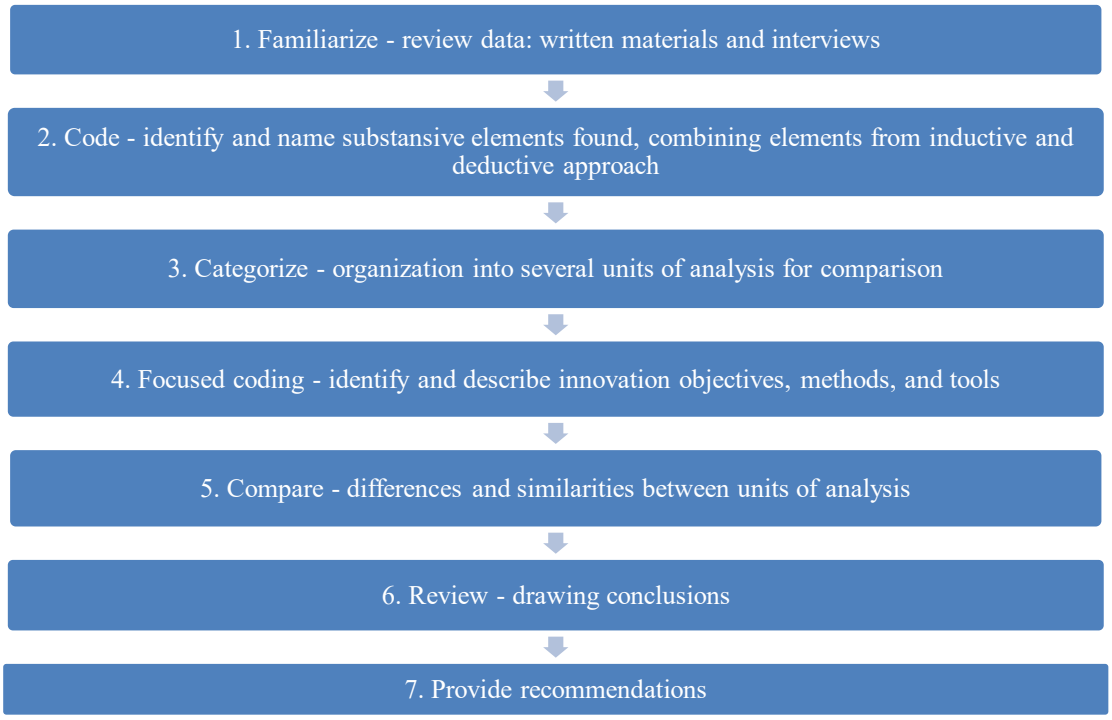

Figure 3 Phases of the analysis describing my methodological approach (adapted from Hodson et al., 2023; Kallinen & Kinnunen, 2021 and Leminen & Westerlund, 2017).

4 Urban Innovation Ecosystem in the context of Helsinki

Finland is one of the top innovators globally having one of the highest budgets per capita for R&D and the percentage of research personnel in the total labor force within European Union and OECD countries. Moreover, Finland has one of the most competitive economies as it is also the most transparent and least corrupt. (Helsinki Living Lab, n.d.). Finland has a large number and variety of living labs, and therefore is one of the pioneers in establishing open innovation networks (Nyström et al., 2014). For that reason, findings from my study are expected to have a high potential for scalability representativeness.

In this study, I focus on the capital of Finland, the city of Helsinki being the leading city, leading the way for other Finnish cities (Jäntti et al., 2023). Helsinki has a long history of community participation drawing from both institutional efforts and the legacy of community's self-organizing activities, such as neighbourhood associations and NGOs (Kuokkanen & Palonen, 2018).

Helsinki can be seen as an urban innovation ecosystem itself, as an extension of the living lab idea due to its approach to innovation. Helsinki highlights advancing the open participation of communities, by involving them through different roles and functions (Anttiroiko, 2016). Some projects involve the community by giving them a say, while other projects concentrate on securing community's rights as political actors, and others make use of community's knowledge and experience as users. (Anttiroiko, 2016). Moreover, Local Government Act (410/2015) obligates local governments to arrange opportunities for community participation and local councils are therefore responsible to enable the participation (Jäntti et al., 2023).

The city of Helsinki aims to reinforce its position as an international spearhead in participation and openness being user-centered city. (City of Helsinki, 2018). To enhance the opportunities for the community to influence Helsinki's services and decision-making, the city has developed community participation model. The three core principles of the model are: 1) utilizing individual and community expertise and knowledge, 2) enabling community-initiated activities, and 3) providing equal opportunities for participation (City of Helsinki, 2020).

Some participatory methods to involve the community encompasses an online developer community, involving over 700 active volunteered individuals (Spilling & Puomio, 2023) participating in research, discussions and testing (City of Helsinki, 2022), participatory

budgeting called “OmaStadi”, online service called “Kerrokantasi” for sharing opinions as well as a platform to design and manage community engagement called “Maptionnaire”. Additionally, there are seven borough liaisons “stadiluotsi” distributed across Helsinki and their task is to help the community to find the right channels for collaboration with the city. They support and promote diverse participation and act as an intermediate between the community and the city (City of Helsinki, n.d. -c).

In the early 2000s, the concept of living labs started to gain momentum in Europe. To respond the city of Helsinki initiated Helsinki Living Lab to foster co-creation and implementation of solutions for urban challenges. Helsinki Living Lab refers to all different living labs within Helsinki Metropolitan area. It serves as a platform for promotion of user-driven methods and tools for the improvement of products and services. One of the main key economic factors of Finland has been the creation of a supportive innovation environment and the health and welfare of business is valued similarly to its citizens. (Helsinki Living Lab, n.d.). Currently, Helsinki Living Lab is no more referenced, instead redirecting internet users to Forum Virium Helsinki’s webpage.

Open innovation activities organized by Forum Virium Helsinki are strongly located in the following areas within Helsinki. Jätkäsaari and Kalasatama are new and active neighbourhoods that have integrated significant amount of innovation projects during the past decade. More recently, similar innovation projects have been also introduced in urban renewal areas, that are older areas and characterized by different demographic profiles from newer areas.

4.1 Urban Profiles of Selected Helsinki Areas

4.1.1 Jätkäsaari

Jätkäsaari is an urban, seaside area with dense constructions, trams, and parks. It is a new area as its construction started on 2010 and it is planned to be ready 2020 (City of Helsinki, n.d. -a). Previously a brownfield area is to be converted into housing for nearly 20 000 people (Spilling et al., 2019). One fifth of the area is planned for parks. The housing selection is diverse with owner-occupied apartments, privately financed and government-subsidized rental apartments, as well as housing for students and seniors. (City of Helsinki, n.d.-a).

The passenger port of the ferry traffic into Helsinki is situated in Jätkäsaari resulting in around seven million passengers passing the neighbourhood annually. Two main bridges connect the port and the city center and the area is therefore encumbered by high traffic peaks. This characteristic makes Jätkäsaari a compelling location for mobility-related projects, and it has consequently a long history of R&D projects in this field. (Spilling et al., 2019).

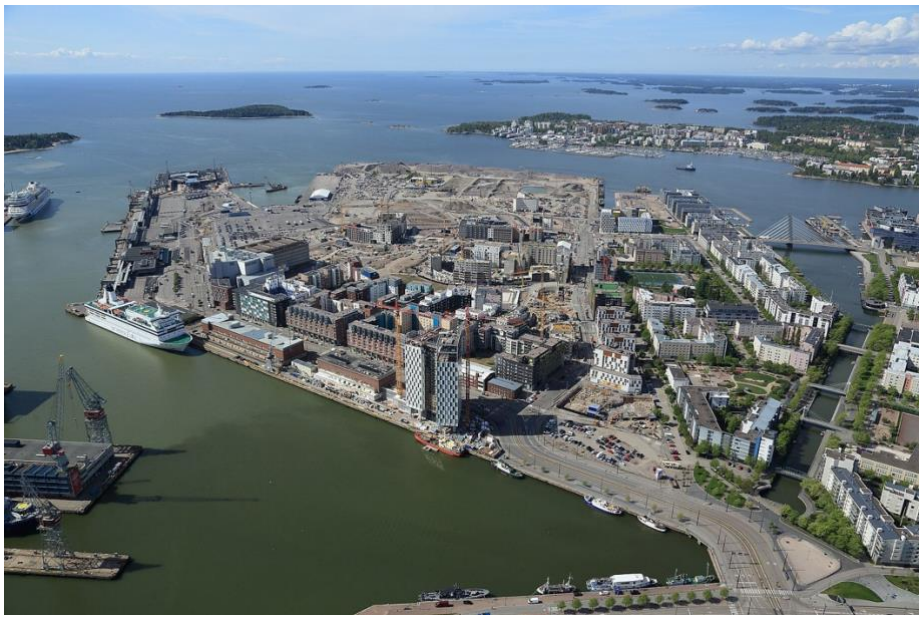

Figure 4. Jätkäsaari in 2016. (Suomen Ilmakuva Oy, 2016).

4.1.2 Kalasatama

Much like Jätkäsaari, Kalasatama is newly developed coastal area. Previously, it served as an industrial and harbour purposes since the late 19th century, but more recently has been expanded through land reclamation. First residents moved to the area during 2012. It serves as a home for 30 000 residents and provides employment for over 10 000 individuals upon completion during the 2030 decade. It is situated east of the city center and is densely constructed with various services and transportation alternatives. The area itself lacks green spaces, but a short walk away, the extensive island park of Mustikkamaa is situated. (City of Helsinki, n.d.-b). The houses are mostly apartment buildings, some of them being towers ranging from 20 to 37 floors, but area also includes lower townhouses providing a diverse housing stock.

Figure 5 Aerial view of Kalasatama, Mustikkamaa in the upper left corner, Helsinki (Joneikifi, 2020).

4.1.3 Urban Renewal Areas

Urban renewal initiative, involving areas of Malmi, Malminkartano-Kannelmäki, Mellunkylä and Meri-Rastila, provides solutions to segregation and fosters balanced urban development within Helsinki. Areas included are facing socioeconomic challenges, and their development has stayed behind from the rest of the Helsinki. However, these areas have significant potential for future growth due to their accessibility and closeness to rail transport, supporting urban densification and efficient mobility. Therefore, these areas will receive comprehensive regenerations focus from construction to social enhancements within communities. (Helsingin kaupunki, 2024).

Need-based targeted funding is allocated to these areas to offer additional resources, when an individual or a community has lower opportunities to secure their well-being. The overarching goal is to create neighbourhoods where everybody, despite their background, can enjoy the high quality and safe city life. (Bayar, 2023).

The objectives are related to urban vitality, comfort, services, commitment and interaction, by creating open, participatory and various channels for communication. New types of participatory methods and innovation processes are aimed to enhance the participation of the community. (Bayar, 2023).

Figure 6. Railway station in Malmi, Helsinki (Toivari, 2022).

4.2 Forum Virium Helsinki

The case study in this thesis is conducted in cooperation with Forum Virium Helsinki (FVH), a non-profit innovation intermediary established in 2005 and based in Helsinki. Originally, the company was co-owned, private sector entity, but later the city of Helsinki realized its potential and bought the company to foster more citizen-centric innovation projects (interviewee A). By promoting openness, democracy and inclusion in their projects, they implement the strategy of the city of Helsinki (Anttiroiko, 2016). The city of Helsinki provides the core fund for the company, but mostly FVH operates on European Union funding. (Forum Virium Helsinki, 2024).

The objectives of their strategy include three main points: 1) supporting Helsinki's ability to utilize technology and digitalization, 2) helping companies to use Helsinki as a development platform, and 3) being a renewing and agile expert organization (Forum Virium Helsinki, 2024).

FVH is an innovation intermediate organization that pilots and develops urban innovation projects aiming to scale for the entire urban community. These projects may result in new companies, products, data or practices. FVH typically runs approximately 30-40 projects concurrently, with a length of six months to multiple years. (Forum Virium Helsinki, n.d.).

During the years of 2005-2024, they have run 210 innovation projects with 420 partners, including companies, universities and cities, as well as with 3 500 members of the community (Forum Virium Helsinki, 2024).

FVH plays a pivotal role in enhancing the utilization of data, new technologies and digitalization, while also considering the climate aspect through scalable co-creation projects. Their strategic objectives highlight their commitment to fostering innovation and sustainability through collaborative initiatives and offering a platform and open ecosystem for piloting. Helsinki together with FVH aspire to lead globally in its smart city development initiatives. (Forum Virium Helsinki, n.d.). While FVH's projects clearly improve the quality of life in the community, their objectives are often connected to bringing economic growth and wealth to the area.

FVH comprises three main programs: smart city, smart mobility and data. All projects implemented by project teams fall under one of these programs. Some of the projects explored in this thesis are conducted in collaboration with international or domestic organizations, meaning that FVH may not be responsible for organizing the entire project, but responsible for its implementation in Helsinki.

It should be noted that while the city of Helsinki has established specific requirements for community participation outlined in their official strategies and laws, FVH is not obligated to generate such community participation, as it primarily interacts with conventional innovators like companies. Nevertheless, involving the community is crucial for aligning innovation with real needs. However, participation tends to be specific, sudden, and ad-hoc. In certain projects, FVH has outsourced community participation to external entities (private project documentation).

FVH has collected some lessons from successful projects into its project publications. Although FVH does not follow any specific process model to guide its operations, it has published *The Anatomy of Successful Development Project*, which outlines five key stages: 1) identifying the problem, 2) ensuring commitment of key partners, 3) involving users, 4) testing, and 5) improving and collecting feedback. (Partanen, n.d.). It is important to acknowledge that these publications offer a generalized framework, showcasing potential methodologies rather than a detailed approach used by FVH.

While FVH benchmarks and leverages best practices for participation from other organizations, such as the European Network of Living Labs, it also employs its own methodologies, which are explored in the following chapter.

4.2.1 Methodology by FVH

Regularly, FVH publishes its good practices observed within their projects for others to leverage, aligning with the knowledge sharing objectives of innovation intermediaries. Recently, following the expanding of FVH's innovation activities into urban renewal areas, FVH collaborated with the City of Helsinki to release a publication titled "Co-Creating Innovative Districts: Tools for Urban Innovators" in 2021. In the following section I will briefly introduce the methodology and methods related to co-development drawn from this toolbox. Some of them are further elaborated upon in the findings chapter.

Citizen Innovator Pool

Since 2019, Forum Virium Helsinki has cultivated an engaged community of citizens in its mailing list, known as a "citizen innovator pool" called Trial Troops with around 550 members (interviewee C). This serves as a community-based model for the community participation.

Various projects have engaged with this community through surveys, workshops, and pilot programs allowing members to give feedback and influence innovation development, thereby contributing to making Helsinki a more functional city (Karmala, 2021). The main activities for Trial Troops include testing new solutions, and members are sometimes invited to participate at different stages of the innovation process as both contributors and users. The mailing list is open to anyone, offering members an early access to information about new technology and innovation.

The Trial Troops model contains four main activities: recruiting, informing, rewarding participants and gathering feedback through different channels. While this model serves as a tool to enhance community participation, public awareness, and the innovation process (private document), adapting it to include a more comprehensive sample remains a challenge (personal communications). The model tends to attract mostly active community members who have the resources to participate.

Within urban renewal areas, Trial Troops have not yet been established. However, with the recent shift in focus toward these areas, engaging members from these communities becomes increasingly relevant.

Urban Lab Spaces and Pop-ups

Urban lab spaces serve as a meeting place that bring together different stakeholders, including the community, to facilitate innovation and collaboration. In addition, they serve as showrooms or piloting platforms. (Fiksu Kaupunki, n.d.).

Similarly, urban pop-ups provide a venue for multistakeholder collaboration and idea exchange. They are used when a space for meetings, workshops, and demo sessions is needed. Green pop-ups are outdoor urban built from modular elements, such as benches and urban nature. (Fiksu Kaupunki, n.d.). This approach offers a lower threshold for participation compared to indoor spaces, as people can easily pass by.

Agile Piloting Co-creative Labs

Agile Piloting programme serves as a framework for collaboration and co-creative experimentation (Spilling & Rinne, 2020). The program unites companies, city officials, the community, and other players to speed up smart city development through a model that enables quick experimenting in real environments. This model aims to maximized learning through involving diverse stakeholders. Developed in Kalasatama starting in 2013 by FVH, the program facilitated 21 agile pilots between 2016 and 2018 and has since been adapted and further developed in other contexts. (Mustonen et al., n.d; Spilling et al., 2019).

Agile piloting provides an effective approach to creating urban innovation ecosystems as it opens the city infrastructure, services, and data for the urban living lab experimentation (Spilling et al., 2019). This requires continuous maintenance of the stakeholder network by the innovation intermediary, who must obtain great people skills as well as the ability to coordinate various processes. When well-maintained, the atmosphere fosters collaboration, trust, and openness. (Spilling & Rinne, 2020).

The model enables testing prototype and early innovation solutions in real-life urban labs for a short period of time, usually maximum of six months. Moreover, agile piloting enables the participation of smaller actors, like start-ups and SMEs, in contrast to conventional smart city development, which often involves large organizations and companies. Co-creative process is

in the core of the development, and program therefore provides some methods for co-creation, access to communities, city infrastructure, networks, and market visibility. (Spilling et al., 2019). The themes of the pilots range from climate solutions to education, wellbeing, and mobility. (Fiksu Kaupunki, n.d. -a).

Agile Piloting Process presented by Spilling et al., 2019:

1) *Stakeholder mapping and definition of themes*
2) *Open Call for solutions*
3) *Selection of pilots*
4) *Experimentation (involves recruiting users and collaboration)*
5) *Evaluation*

Design Sprint -methodology for Co-creation

Design or co-creation sprints are fast-paced processes that bring various stakeholders together to ideate on a selected theme. Through the facilitation of co-design activities, the goal is to innovate and find solutions. These sprints serve as a practical tool across various contexts and themes, supporting multi-sectoral co-creation in urban development projects. (Fiksu Kaupunki, n-d. -b).

This methodology consists of five phases: understand, define, sketch, decide, and prototype. Depending on the nature of the solution, community efforts may be needed during the testing stage of the process, enabling ecosystem building and engagement of relevant stakeholders. (Fiksu Kaupunki, n-d. -b).

This methodology is based on the concept of design thinking, which aims to solve business problems in a human-centred way, focusing on end users rather than on the business itself (Dorst, 2011). Design thinking provides a framework for problem-solving, and identification of business issues and opportunities (Brown, 2008).

4.2.2 Description of Projects Under Investigation

This chapter briefly introduces the seven projects included in the study that showcase community participation in Helsinki's open innovation projects. These chosen projects are drawn from all three FVH's programs: Smart City, Smart Mobility and Data. Therefore, they

have diverse focuses and approaches providing valuable insights into how the community has been contributing in shaping the city within diverse contexts.

The projects under investigation involves seven cases:

Smart City -program:

6Aika Smart Kalasatama – serves as a pioneer in smart city planning. The focus was on various themes related to sustainable and practice everyday life, such as housing, energy, and food (Forum Virium Helsinki presentation). The area serves as a model for other areas in Helsinki and there has been more recent shift in bringing the learnings to urban renewal areas.

B.Green – aimed to develop a model for digital and participatory urban planning. The approach promoted pre-planning of green infrastructure solutions in Kalasatama. The project employed multiple green solutions with the community.

Helsinki Innovation Districts – involves Helsinki's urban renewal areas, very distinct from each other, with specific needs. The project addresses each area with unique themes that cater to their specific needs and priorities. These themes include lighting, street space, resident experience, vacant spaces, green infrastructure and so on. The main focus in every area is still the same – introducing new solutions to complement existing structures. (private project document).

Data program:

HOPE (Healthy Outdoor Premises for Everyone) – aimed to empower the community to understand and improve their local air quality. Through participatory data collection, visualizing the collected personal data, and empowering action within participants the project addressed the challenge of inaccurate and inaccessible air quality data. (Urban Innovation Actions, n.d.)

UrbanAge – promoted an age-friendly city through the use of digital technologies to improve the involvement of seniors in urban planning. Previously, the involvement and information concerning seniors have been fragmented and challenging to utilize effectively. Therefore,

UrbanAge created an engagement tool suitable for this target group, in collaboration with them. (private project document.)

Smart Mobility program:

Jätkäsaari Mobility Lab – promotes sustainable transportation and using Jätkäsaari area as a living lab. The initiative tests and refines new mobility solutions, encourage the community to change their behavior for more sustainable mobility options, such as walking and cycling, through applying agile piloting, innovation competitions, and fostering community participation. (Forum Virium Helsinki presentation).

Mobility Urban Values – aimed to influence community's transportation behavior through gamification and encouraging to use sustainable mobility options. Additionally, the game developed during the project collected community's mobility data, and methods to utilize this data were explored. This project aimed to answer to some gaps within urban mobility knowledge in measuring personal impact in real-time. (private project document).

5 Findings

This thesis scrutinizes the community participation methods employed by the innovation intermediary organization Forum Virium Helsinki (FVH) in its open innovation projects. Participatory activities play a crucial role in facilitating these projects, making it essential to thoroughly investigate the participatory elements and analyse the potential input the community may offer.

Through comparison of multiple and diverse cases, the objective is to understand participatory processes and the opportunities they present. The following chapter lays out the key aspects of the comparison, including the three dimensions presented in COPP framework: context, participatory processes, and outcomes reflected against the objectives. A closer examination and an in-depth analysis of the process timeline and levels of participation will be provided later in the *Participatory Processes* section of the chapter. The findings cover various projects linked to all three programs under FVH, which are categorized under three overarching themes: smart city, smart mobility and data.

The indicators enabling the comparison and their characteristics, as well as the rationale for their selection, are detailed in the theoretical framework chapter on the COPP framework.

5.1 Overview of the Projects and Their Community Participation

5.1.1 Context Dimension

Various authors claim contextual aspects being critical for understanding the outcomes of participatory processes (see list Hassenforder et al., 2015, 6). Often, some frameworks focus solely on the process and its outcomes, without addressing the context dimension (Hassenforder et al., 2015). However, since the case study and selected projects are located within a single city and build upon previous efforts, it is necessary to acknowledge the previous experiences specific to the location. Moreover, when implementing a specific participatory method in different contexts, the outcomes may vary notably (see list Hassenforder et al., 2015).

This subchapter complements the context chapter, which presents areas influenced by FVH, by providing more project-specific information on each chosen project.

Table 2. Context dimension of each project. Table adapted from the COPP framework (Hassenforder et al., 2015; Veeckman & Temmerman, 2021).

Project and programme	Timing, Location	Target System Elements	Past Interventions & Relationships
6Aika Smart Kalasatama – Smart City	2016–2018, Kalasatama	Smart mobility services, waste management, co-creation of local services	✓ Multiple projects since 2013, Strong existing relationships
B.Green – Smart City	2020–2022, Kalasatama	Green infrastructure	✓ Strong existing relationships, possible participation fatigue (interviewee)
Helsinki Innovation Districts – Smart City	2020–2023, Renewal areas	Expand innovation activities. Develop solutions focused on different themes in each area.	X First approach
UrbanAge – Data	2021–2024, Malmi (Renewal area)	Develop inclusive, healthier, happier, age-friendly cities. Assess disruptive technology for evidence-based urban planning.	✓ Good existing relationships
Mobility Urban Values – Smart Mobility	2017–2020, Jätkäsaari	Mobility behavior. Potential of illustration and gamification.	✓ Good existing relationships
HOPE (Healthy Outdoor Premises for Everyone) – Data	2018–2022, Jätkäsaari, (Pakila & Vallila)	Air quality. Feedback loop between data and community actions.	✓ Good existing relationships in Jätkäsaari X First approach in Pakila & Vallila
Jätkäsaari Mobility Lab – Smart Mobility	2019–2021, Jätkäsaari	New mobility solutions for the city, community and tourists. Synergies between subprojects.	✓ Good existing relationships sustained participation

Note. Source: Author's compilation based on interviews and written material.

As shown in table 2, target system elements in these projects are ranging widely from waste management to green infrastructure and air quality, and inclusive urban development. A strong emphasis is put on smart city development, particularly on sustainable mobility solutions in Jätkäsaari. A diverse spectrum of these elements reflects various urban challenges, which are addressed through open innovation projects, where an innovation intermediary serves a crucial role in facilitating cooperation.

One publication by FVH highlights the advantage of concentrating piloting activities within selected city districts. This strategy creates synergies between pilots and projects, driving urban development on various levels. Contacting and activating community members is also

easier within a specific, profiled district. Such localized efforts “transforms” the community as active developers, providing long-term perspectives for organized activities. In addition, more efficient and tailored communication and efforts are possible due to profiled piloting areas. (Spilling & Rinne, 2020).

Despite the clear advantages of this approach, possible participation fatigue has been observed in Kalasatama. This observation can be attributed to the intensity of participation activities within a popular piloting area. However, changing the target system elements has helped to maintain community’s interest. (Interviewee 3).

5.1.2 Participatory Process Dimension

COPP framework indicators within this dimension are drawn mostly from the significant steps, when participatory process is designed, and main elements considered in in-depth exploration of the processes within literature. (Hassenforder et al., 2015).

Table 3. Participatory process dimension, adapted from COPP framework (Hassenforder et al., 2015; Veeckman & Temmerman, 2021).

Project and programme	Participatory process objectives (inc. possible selection of the participants and group size if adaptable)	Degree of participation achieved	Methods and tools
6Aika Smart Kalasatama – Smart City	Improve participation experience in the newly developed area. Develop an ULL. Community-driven planning.	Information, ambitions for co-creation and consultation	Agile piloting Co-creation events Innovator’s club Trial Troops GIS-tools
B.Green – Smart City	Design data-driven, participatory approach. Co-design green infrastructure. Participation in data collection.	Consultation	Agile piloting Survey Co-creation events Testing sessions City walk
Helsinki Innovation Districts – Smart City	Broaden participation. Enhance dialogue. Improve visibility and understanding. Strengthen the sense of inclusion. Gather ideas, data, and feedback. Special focus on seniors and youth.	Consultation	Agile piloting Street polls Green pop-ups Testing sessions City walks Workshops Gameday for children Surveys Real-life interaction
UrbanAge – Data	Improve co-design. Design a user participation strategy. Enhance interaction and understanding. Identify real needs. Co-create participatory data collection device. Feed the data model through participant input.	Co-creation, Information	Citizen science Participatory data collection Data collection sessions Workshops for device development

Mobility Urban Values – Smart Mobility	Gather input and feedback. Collaborate and empower. Co-design the game. Promote mobility behavioural change through gamification. Data collection through the game.	Co-creation, Information	Co-creation workshops Testing campaigns
HOPE (Healthy Outdoor Premises for Everyone) – Data	Increase understanding and empowerment. Promote behavioural change. Implement co-design and participative budgeting. Co-create data collection device. Gather views and attitudes. Individuals from diverse backgrounds.	Information	Citizen science Participatory budgeting application Measurement campaigns Feedback sessions Online surveys Events for sensor distribution Trial Troops
Jätkäsaari Mobility Lab – Smart Mobility	Develop a ULL for smart mobility. Foster a culture of community participation. Involvement in various activities. Identify technology reception. Co-define challenges.	Consultation	Agile Piloting Surveys Testing sessions Workshops Info webinars Trial Troops/ VIP-pool

Note. Source: Author's compilation based on interviews and written material.

As shown in the table 3, participatory process objectives across the seven projects introduced showcase important aspects related to the role of an innovation intermediary. More specifically, a non-player enabler innovation intermediary's role, aiming for the well-being of innovation ecosystem and seamless cooperation, aligns well with these objectives. Objectives observed can be divided into themes:

1) Building foundational elements to an area:
    - Establishing ULLs: focus on the physical and digital platform needed for community participation
2) Enhancing participation processes
    - Designing new participatory approaches and tools
    - Enhancing the experience of participation and inclusion
    - Broadening the number of participants
3) Empowering and educating the community
    - Raising community understanding and awareness
    - Empowering the community

- Promoting behavioural change

4) Driving innovation

- Gathering input for the innovation development

Establishing and enhancing ULLs in various areas encompass creating a physical and digital platform for participation. This involves establishing networks, communication channels, and participatory approaches suitable for each area as well as fostering dialogue between the innovators and the community. Designing new participatory approaches involves innovative thinking how to involve community as efficiently as possible. Raising the community understanding and awareness, involves the responsibility to educate, being present and enhancing visibility. Empowering the community may involve supporting them to take action based on information about their surroundings and promoting therefore a behavioral change. Input to the innovation development involve gathering ideas, feedback, existing challenges, real needs, concerns as well as views, attitudes, priorities, and preferences. When it comes to new technology and practices, understanding the attitudes is crucial, as it may reveal valuable insights into the factors that influence successful adoption (interviewee 5).

Methods employed to achieve these objectives are versatile, encompassing a range of traditional and innovative approaches. These include agile piloting methodology, traditional ways to participate, such as surveys, interviews, street polls, and feedback sessions, as well as community meetings and local participation. Additionally, less traditional approaches like the participant pool, citizen science devices, participatory budgeting, applications, city walks, and gamedays, as well as approaches related to gamification, are employed to generate community participation. In most cases, projects engage community members as surveyors or testers to validate pilot programs or gather feedback.

Communication and networking

Utilizing diverse communication channels is essential to reach a broad community outreach, as different channels cater to different preferences and habits (interviewee 3). Proactive communication throughout the project supports its impact. This includes clearly communicating participation objectives, explaining data collection and usage, and providing timely feedback on pilot results to the community. (B.Green, n.d.). Such transparency fosters trust and long-term engagement for future pilots as well (Spilling et al., 2019). Moreover, managing expectations of participants is important through the whole process.

A significant aspect of community outreach involves the variety of media used, both traditional and non-traditional approaches. To foster trust, inclusion, and participation, a multifaceted combination of community strategies should be utilized. Furthermore, all possibilities of communication should be explored as widely as possible to maximize community participation in pilots. (Private project self-evaluation).

Projects have made use of diverse physical spaces like cafes, restaurants, libraries, and other meeting places alongside social and traditional media, with Facebook's neighbourhood groups often highlighted as the most important one (interviewee A, 3, 5). In Jätkäsaari, a dedicated webpage for pilot testing was created to inform the community about all the activities occurring in the area. It served as a successful and valuable tool for communication for years (interviewee A). While Facebook and other media are common, direct outreach, including physical media like posters and flyers, remains necessary for comprehensive promotion in some cases (interviewee 3).

Leveraging existing community structures, such as neighbourhood events, evenings, festivals, and meetings offers valuable opportunities to organize testing sessions in natural and familiar settings, where people are already out and engaged. (Interviewee B, C, 5). As community participation happens on a voluntary basis, it is essential to plan participatory activities with this consideration in mind (project self-evaluation). Therefore, casual and effective approaches like these tend to be effective.

While diverse communication channels are important, diverse methods used to foster participation are equally crucial to ensure the adoption and diffusion of innovations. Game days, city walks, gamification, and various events indicate to a commitment to making the participatory process more engaging and enjoyable, particularly for different age segments. However, despite these efforts, there is a lack of ambition to reach more passive members of the community. To address this, several objectives have defined target groups based on criteria such as age or location, for example children or seniors in urban renewal areas. Currently, FVH is organizing several projects that aim to foster participation among vulnerable groups (personal communications). This focus in inclusivity aims to ensure these groups have equitable access to innovation initiatives.

Communicating with the community is not an easy task, taking a lot of time and effort (private project report, interviewee 3). Therefore, it is essential to identify the key local actors and cooperate with them to comprehend the local context, with its challenges and opportunities. Furthermore, to maximize the impact and efficiency, it is recommended to leverage previously established good practices and networks in subsequent initiatives.

Within the FVH, there is a recognized need for the systematic handling and utilization of contact information. However, there are challenges related to General Data Protection Regulation (GDPR) for contact sharing and other barriers related to gathering information, such as the place of residence of participants.

5.1.3 Output and Impact Dimension

This chapter intends to identify major changes achievable through participatory processes, rather than laying out all possible outputs, outcomes, and impact. The following table is the last part of the COPP framework and gathers the main outputs risen from the materials and possible impacts observed. Furthermore, barriers and drivers are laid out for more in-depth understanding of the methods and tools.

Table 4. Adapted from COPP framework (Hassenforder et al., 2015; Veeckman & Temmerman, 2021).

Outputs & Impacts	Main outputs of the participatory process	Barriers for participation	Drivers for participation	Impact on actions implemented by participants
6Aika Smart Kalasatama	Innovator's club success. Community enjoyed participating. "1/3 of the community has participated in co-creation activities." Over 100 co-creation events with stakeholders.	Low support for community-driven innovation. Resource challenges. Lack of systematic handling and utilization of contact information.	Living lab space fostered community-driven activities.	Valued feedback. Steering innovation development. Community-driven smart city development inspires abroad.
B.Green	Around dozen participants for each pilot. App was co-developed and tested. Active survey responding. Demonstrated the potential of digital tools for participation.	COVID-19 pandemic.	Easy involvement of schools. Visualizations enhances communication.	Steering innovation development. Survey played a big role for the city. Community's feeling of being heard.
Helsinki Innovation Districts	Enhanced dialogue, visibility and understanding.	Focus on technology and innovation, rather than the community.	Proactive and systematic communication.	Cooperation with the community increased.

	Partly oriented towards the needs of the community. Hundreds of participants in events at pop-up space.	Gathering new participants. Youth as a challenging target group to engage. Resource challenges. Smart city development mindset alienating for seniors. Immaturity of the innovation.	Reaching schools and broad audiences. Monitoring testing, rather than relying on surveys. Engaging directly (fieldwork), over expecting them to initiate contact.	Pop-up spaces created opportunities for interaction.
HOPE	Community pool created. Over 100 participants in data collection campaign with 1 million measurements. Nearly 600 voters in the app. Participants decreased after each round.	Participants aged 18-35 under-represented. Females had higher rates of participation. COVID-19 pandemic. Low participation despite marketing efforts, methods, and budget allocations. Participation limited to those already interested. Technical issues decreased motivation.	Professional support. Personal data access. User pages for data follow-up. Interest in target system elements. Motivation in participating in science. Motivation strategies, such as competition, app enhancement, and vouchers.	Successful crowdsourced data collection, quality data. Community pool kick-off. Clean air route planner created
UrbanAge (barriers and drivers identified by 3 European piloting cities)	2 co-creation sessions (online) with older adults. Participation rates low.	Lack of time Physical health barriers Bad facilities Bad past experiences Bad awareness Too many events No feeling of ownership Limitations in inclusiveness, e.g., varying capabilities to use digital tools.	Civic duty Having fun Self-efficacy Good awareness Visualisations available.	Enhanced understanding of community's needs and experiences. Co-creation workshops helped determine possible use cases.
Jätkäsaari Mobility Lab	Participation in various pilots. Formation of VIP community pool. Certain pilot got terminated due to lack of participants.	COVID-19 pandemic Delays in solution development hindered testing. Changing old behavior patterns to new ones. Convincing to download a new app. Inclusivity and accessibility challenges. Immaturity of the pilot.	Collaboration with local associations and existing activities. Focusing activities within an area enables greater synergies and familiarity for participation. Tangible pilot. Facebook marketing the most efficient platform for recruitment.	Establishment of a smart mobility test area. Qualitative feedback and error reporting highly valued. Perception surveys valuable to the city. Identification of communication requirements and customer expectations.
Mobility Urban Values	During demo phase dozens of participants.	Concerns over privacy policies. Convincing to download a new app.	Jätkäsaari community's enthusiasm for development. Finns are "population of mobiles". Competition aspect with a reward.	Increased awareness and engagement. Growing sense of community in Jätkäsaari.

Note. Source: Author's compilation based on interviews and written material.

Community participation has played a central role in multiple projects employed by FVH, as highlighted above. These efforts are not only aiming to foster community participation itself but, perhaps more importantly, they aim to cultivate a sense of ownership and empowerment among the community. Across the projects, the reported impacts are positive, suggesting that

the chosen methods have successfully fostered some level of participation among the community. Moreover, the nature of the impact varies as objectives vary.

However, all projects did not achieve the desired amount of participation or did not achieve the objectives stated for participatory process. For example, certain pilot got terminated due to lack of test users that was required to achieve the objectives. That incident gave a valuable lesson of how challenging it is to foster community participation and how important it is to cultivate user motivation and added value from the beginning (private project document).

There is a need for active monitoring of community participation, in order to observe emerging challenges promptly. Implementing early interventions is crucial to address these issues effectively and maintain participation throughout the lifecycle of the project. (private project document, interviewee B). This emphasis on monitoring highlights the importance of understanding how different factors can either foster of hinder participation. The following sections will delve deeper into the various barriers as well as drivers encountered.

Barriers

A range of challenges impacting community participation emerged from the materials and interviews, encompassing the following aspects:

- *Resource and management issues:* Relates to lack of resources, like funding and capacity, allocated to participation. There is a lack of systematic processes for participation in FVH. This partly results from GDPR restrictions.
- *Impact of the COVID-19 pandemic:* Affected to all participation activities during 2020–2021, participation took place online which hindered participation and made it less accessible and engaging.
- *Technological barriers:* Sensor or device malfunctions, low approachability or usability as well as immaturity of solutions decreased motivation.
- *Inclusivity concerns:* Difficulties in gathering a diverse sample of participants. Some demographic groups, such as individuals aged 18–35, males and youth were challenging to involve in some cases. Seniors have faced difficulties with technology resulting in digital inequality.

- *Perceived lack of user benefits:* Inability to gain immediate benefits for participation affected participation.
- *Motivation strategies:* For instance, maintaining motivation throughout the data collection campaigns caused difficulties. Shorter campaigns were suggested afterwards by participants.
- *Behaviour change:* It is challenging to change people's behaviour and habits, such as downloading a new app turned out almost an impossible task.

An important insight from one of the interviewees was the challenge of making participants download a new application (interviewee 3). The recommendation is to adapt new features to already existing applications. This same ideology is applicable elsewhere: always aim to integrate new practices into established ones to enhance acceptance and effectiveness (project self-evaluation). This approach decreases the barrier to participate, but also leverages the already created familiarity and trust, community has for the existing platforms.

Drivers

On the other hand, the drivers of community participation that emerged include:

- *Familiarity with established practices:* Utilizing familiar channels decreases the threshold to participate.
- *Focusing on a single area:* "Warming up" the area supports new activity. Existing familiarity of FVH and innovation activities is considered valuable.
- *Collaboration:* Engaging with local associations, organizations, and especially schools is an effective way to reach broad audiences at once. Simultaneously, it validates the target group and location automatically.
- *Changing themes:* Changing themes were introduced to maintain interest and reactivate the community.
- *Clear communication:* Clear, consistent, and accessible communication about the project, along with explaining how participant input was utilized, encourages ongoing participation.

- *Fieldwork:* Face-to-face interaction is crucial rather than expecting participants to approach the organizers.
- *Competition and Rewards:* Additionally, elements such as competition and small rewards have stimulated participation at some level. There is a preference to avoid the use of extrinsic rewards, with the expectation that intrinsic value of participation should outweigh the need for incentives (interviewee A).

Collaborating with schools has proven to be efficient and mutually beneficial, as educators are keen to integrate new technologies and learning opportunities to children (interviewee 3). Furthermore, reaching broad audiences through schools and community organizations helped validate the project's target group and location automatically (interviewee B).

Seen from the case studies, it is evident that reaching the community requires clear and immediate benefits and attractiveness as well as maturity and usability from the piloted solution. Usability and immediate added value must be direct to encourage piloting. (Private project document).

A crucial aspect is maintaining open and informative communication channels. In addition to providing project information, it is crucial to transparently showcase how participant's contributions were utilized and valued in order to encourage further participation, foster the sense of ownership, and increase motivation for behavioural change. This approach is necessary for collaborative projects. Interactive user interfaces serve as one solution to disseminate information and facilitate assessment (Virtanen et al., 2023). To serve diverse target groups, diverse and complementary activities, participation modalities, and communication channels are recommended. (Private project document).

5.2 The Participatory Processes

This chapter builds on the previous analysis by examining each stage of the project cycle individually, according to the previously presented four-stage categorization by Almirall et al. (2012): contextualization, concretization, implementation, and evaluation. Within each stage, the level of participation is also evaluated according to the level of participation categorization by Menny et al. (2018): non-participation, information, consultation, and co-creation. This section introduces the most intriguing cases from all seven projects, showcasing

successful approaches and providing detailed insights into each stage's participatory processes.

There are specific participatory methods and tools connected to each specific phase of an open innovation project as intermediaries' responsibilities during the project also varies. Distinctions also exist regarding the target group, in the selected projects, only older adults and children or youth are addressed if any target group is specified. With this analysis I aim to provide deeper insights into the participatory processes and methods used by the innovation intermediary.

Table 5 presents a practical tool for breaking down the process for analysing and planning a participatory process. Laying down all the objectives the project wants to achieve during each stage and listing all the methods and tools used provides a clear visualization of the life cycle of the process. In this table, no lines separate each stage, as they are iterative and not strictly delineated. Similarly, the level of participation is fluid rather than rigidly defined. I have positioned methods according to their most appropriate placement based on my analysis.

Table 5. Summary of the methods within each stage of the process and the level of participation assessed: Levels of community participation along the life-cycle phases (adapted from Menny et al., 2018).

co-creation		Co-creation workshops for tool/game development		
consultation	Surveys Workshops Green pop-ups Interviews Group discussions Innovator's club	Surveys Polls Interviews VR-experiences	Guided testing sessions Surveys Street Polls Mini-interviews Group discussions City walks Virtual reality experiences Gameday for children	Surveys Interviews
information	Recruitment through social and traditional media, previous networks, targeted ads, Trial Troops and VIP-pool Local events, associations, and organizations	Participatory budgeting	Independent data collection/Measurement campaigns	Infosessions Events and forums
no participation				Regular newsletter
	contextualization	concretization	implementation	evaluation

As seen from the Table 5, consultation emerges as a prevalent mode of participation. It appears that workshops remain as the only observed method for fostering co-creation within the community. Furthermore, community participation is notably emphasized in the first phase of the process, with a resurgence during the implementation phase.

5.2.1 Contextualization

Early stage of a project, contextualization, involves identifying challenges, priorities, expectations, and relevant stakeholders for the focus determination. A popular way to generate some community participation at this stage of the process is applying surveys for the general public about their perception towards some new technology or other practices for instance. This method works for a larger number of participants, gathering a large volume of insights. Workshops are another preferred solution when the aim is to involve a smaller group. They work well with exploring broader concepts, while surveys are easier to employ once the topic has been more narrowed down.

At this point of the process, multistakeholder approach is often highlighted to validate the initial ideas. Most of the methods that employ multistakeholder approach are nevertheless not targeted towards the community, but rather companies, experts and other professionals.

As this stage of the process lacks tangible elements, participation might be more challenging to generate compared to later stages when tempting the community to participate is easier. Moreover, the community participation is fully voluntary and therefore participatory activities are necessary to design to be easily approachable and simple. For this reason, connecting the activities to existing and already familiar meetings and events, and to people's everyday lives is crucial.

As previously mentioned, FVH's projects have recently expanded to older neighbourhoods of Helsinki. Expanding into new areas entails a vast amount of work to familiarize oneself with the area and locals. Therefore, the creation of green pop-ups, urban living lab spaces, and events has played a crucial role in initiating engagement with the community.

Green pop-ups are green oases in urban areas, built from modular elements like benches and urban nature. They were first piloted in 2021 as part of the Helsinki Innovation Districts -project in Malmi and Malminkartano, and they received a great deal of positive feedback from the community. The initiative provided a practical way to engage the community and initiate cooperation with local actors. It also served as a communication platform to inform the public

about future changes to the space. The future pilots were provided with solid experience through green pop-ups. (Fiksu Kaupunki, 2021).

Figure 7. Green pop-up in Malmi, Helsinki (Rotko, 2021).

FVH not only reaches out to individuals but mostly seeks support from local community networks, organizations, schools and other initiatives. These entities provide important contacts and crucial communication channels for information dissemination. In addition, Trial Troops are often used, but usually reaching out to them is not enough and recruiting new participants is necessary. Especially, within new projects in urban renewal areas, where Trial Troops has not been yet promoted, therefore lacking individuals from these areas.

5.2.2 Concretization

The concretization stage involves gathering ideas, planning of solutions and prototypes interactively and iteratively. Idea generation activities typically entail brainstorming sessions, workshops, and other creative processes. However, the community is rarely involved in this type of participation and participatory methods used appear to be more passive at this stage.

This stage appears to have relatively low participation rates, as most solutions and prototypes are predominantly suggested by companies. Nevertheless, gathering ideas for innovation development can be facilitated through surveys, polls, and interviews as well as participatory

budgeting applications, such as the one implemented in the HOPE project (Private project document).

In certain projects, there have been some co-creation methods used at this stage of the process. For instance, the UrbanAge project employed an iterative, co-creative approach to fevelop a feedback tool in collaboration with the target group (senior citizens). This approach ensured that the device needed for collaborative urban planning was tailored to the specific needs and preferences of the elderly population. (UrbanAge Project Deliverable).

Another example is from the Mobility Urban Values project, where the product, a game designed to promote behaviour change in transportation, was co-created with the community through workshops. This fostered a sense of ownership within the community, thereby motivating them to play the game during later stages of the project. (MUV Project Report). Simultaneously, the players collected data that informed urban planners about traffic patterns (Forum Virium Helsinki, n.d. -b).

In addition, design sprints can be employed as a strategy to collect ideas from the community, these workshops often target company representatives, local stakeholders, and experts, thereby placing less emphasis on community participation.

5.2.3 Implementation

During the implementation phase, learning is maximized through piloting, trialing, testing, and appropriation. Innovation intermediary's responsibilities in increasing the community's awareness and understanding relate to the role of non-player enabler intermediary identified by Äyväri (2021).

The agile piloting concept is widely leveraged at this point to enable iterative adjustments based on community feedback and observations. Often, community participation occurs only when the real experimentation starts. The level of participation varies depending on the pilot and needs of the piloting company, often positioning the community as test users.

Testing sessions are organized as events, workshops, or integrated into everyday activities. Testing can occur both supervised and guided or independently, thou gathering feedback is more effective when testing is observed by the organizer, as supported by one interviewee who highlighted observational methods and mini-interviews, rather than requesting simple survey answers that lack quality and depth (interviewee B). However, in some cases, the

service provider conducting the pilot manages the process independently, including reaching test users without any challenges. The innovation intermediary provides support in this process, if necessary, within the scope of their resources.

FVH has employed certain innovative methods and tools to enhance the participation experience and community's understanding of target system elements. For instance, in the B.Green project, virtual reality equipment was leveraged to provide testers the opportunity to visualize, experience and test alternative urban realities. Within this project, participants were able to implement and visualize different green infrastructure scenarios in an immersive way. Mobile devices offered similar opportunities, allowing testers to engage with these scenarios in real or substitute environments. The handbook published by this project emphasized the role of digital solutions to serve as an information source on their surroundings, like in this case, of project's local greening initiatives or seasonal uses of green spaces. (B.Green Handbook, 2022).

Another tool, UrbanistAI, has been utilized in a workshop with a similar idea of visualizing possible scenarios using artificial intelligence. While these tools do not necessarily provide official plans or design solutions, they serve as an efficient enabler for enhancing communication with community members unfamiliar with reading architectural plans. By describing their preferences to the AI, community members could see their ideas translated into visual formats, fostering a better understanding of potential urban developments.

Participatory Data Collection

Data collection is another key participatory method during the implementation phase. More passive approaches, as seen in the HOPE project, involved community members were recruited to collect data using small devices. This method did not require large efforts from participants, who only needed to carry the device, yet it allowed participants to track the collected data through an application. This approach not only facilitated the project's data collection but also enhanced participants' understanding of the surrounding environment and its impact on their lives. In addition to the data collection itself, some participatory activities took place, such as the distribution of the devices and a starter session as well as feedback sessions after each collection. (Interviewee 4). This provides an excellent example of how intermediaries fulfil their responsibilities and provide opportunities for learning and empowering while serving as an innovation facilitator.

A more active form of data collection was employed in the UrbanAge project, when a device (Figure 8), co-created together through multiple workshops with both elderly participants and experts, was distributed to a sample of older adults. This device was created to facilitate crowdsourcing of data on slippery streets, unsafe or untidy areas, poor street lighting, and positive feedback regarding green and pleasant spaces. The city organized data collection sessions, and the gathered information was utilized to inform decision-making concerning improvements in these marked areas. (Virtanen et al., 2024).

Figure 8. Participatory data collection tool. (Ella Keinonen, 2024).

5.2.4 Evaluation

The last phase of the project cycle, the evaluation phase, refers to generating learnings and knowledge through feedback and observations. This phase is necessary in order to understand the effectiveness of the project and to inform future projects. However, this stage often lacks active community participation. Surveys and interviews can serve as a potential method to gather feedback from the community, while more in-depth reflection workshops are organized mostly with project partners and piloting companies rather than with the community. As a result, the perspectives of community participants are often underrepresented during the reflection on the outcomes, especially regarding their motivations, what they learned, and whether the project will have a longer impact on their lives.

Participation at this stage is mostly focused on the dissemination of project results and sharing of new knowledge. This can occur through public events, webinars, or forums. Additionally, platforms created for the project serve as a tangible resource for participants to revisit, enabling them to revisit the impact of their contributions. In some cases, participants must seek out the follow-up information themselves.

A critical gap in the current approach is the lack of a systematic mechanism for collecting and handling comprehensive feedback on the overall participation experience. Therefore, opportunities to learn from the community are often missed.

5.2.5 Participation Levels at Various Stages

After the analysis of the different stages of the project cycle, I will provide some more insights into the levels of participation and how it varies throughout these stages, highlighting the challenges and opportunities for achieving relevant participation.

Co-creation is a process of collaborative innovation where all stakeholders have equal influence over the outcomes. The term is nevertheless often used quite loosely to describe participatory activities when they often fail to involve equal collaboration, especially with the community. Even though, most interviewees and overall atmosphere around the subject consider co-creation as the most ideal level of participation, its actual implementation and effectiveness differ between different stages. Participation can and should occur at various levels, and objectives can be achieved without always striving for co-creation.

More active participatory activities are more easily achieved during the contextualization and implementation phases, where most of the participatory activities occur. These phases provide more intuitive opportunities to create participation. However, the concretization and evaluation stages often rely on more passive activities with the community, while the participatory activities are more focused on the traditional innovators side as well as experts. This may result in underrepresentation of the community when considering crucial moments of reflection.

Certain participant articulated a critical challenge related to participatory processes, stating that "one moment it seems too early to share ideas and concepts, and the next moment it’s suddenly too late to provide feedback" (translated from Finnish). (B.Green). This observation highlights the importance of maintaining a continuous information flow towards the community and providing timely opportunities for influence.

The success of participation activities relies on countless factors. Although it seems like projects that include some type of consultation or co-creation activities already early on, like Urbanage and Mobility Urban Values, are able to maintain higher levels of participation throughout the project lifecycle.

6 Conclusions

This study explored community participation within urban open innovation projects in Helsinki, with the aim of understanding the objectives and methods related to generating participation across different phases of these projects. The analysis focused on observing these different phases of the process, recognizing that each encompasses distinct objectives and dynamics. To effectively understand participatory processes, it is necessary to view them as iterative and evolving phenomena rather than static or linear projects.

Differentiating levels of participation was another significant consideration. While the level of co-creation with the community is frequently emphasized in materials, findings, and definitions of participatory concepts revealed that such level of participation rarely materialized in practice. Instead, most of the methods observed generated consultation- or information-level participation. Categorizing the participation into fewer levels enabled a more focused and clear evaluation of the observed practices.

The study employed the Comparison of Participatory Processes (COPP) framework due to its emphasis on contextual factors alongside the participatory process and its outcomes. Considering the nuances within piloting areas was deemed necessary. Moreover, the COPP framework enabled a nuanced analysis of various project types. However, its consideration of participants' perspectives required adaptation, as this dimension extended beyond the initial scope of the study.

6.1 Answering the research questions

1) What types of community participation methods does the innovation intermediary FVH employ to facilitate community participation in its open innovation projects?

Forum Virium Helsinki employs varied participatory methods to foster community participation across its open innovation projects, with the form and intensity of participation varying across the project lifecycle. In the contextualization phase, participation is relatively active, focusing on gathering input through surveys, public events, and informal engagement like green pop-ups. These methods aim to ground projects in local needs and priorities, largely through consultation and information-level of participation.

During the concretization phase, community participation is limited, as solution development is led by companies and other professional innovators. However, this stage includes the only

observed co-creation activity, when workshops were held to design the solution with the specific target groups to answer to their specific needs. The implementation phase re-engages the community through testing sessions, both supervised and independent, feedback queries, and occasionally utilizing digital aids like VR and AI to support understanding and involvement. Participatory data collection also enables low-intensity engagement during the implementation phase. Community participation during the evaluation phase remained minimal, as reflections and learnings are mostly shared with other stakeholders. The community remains underrepresented during a critical stage in which key learnings are generated, which limits the inclusion of valuable insights from their perspective.

2) What are the primary objectives of FVH regarding community participation in its open innovation projects, and how are these objectives accomplished?

Forum Virium Helsinki's objectives for community participation in its open innovation projects align with the established roles of innovation intermediaries identified in the literature. Objectives, like raising awareness and understanding of the community, establishing and maintaining an urban living lab, designing new participatory approaches, promoting behavioural change and empowering the community in addition to gathering the actual input for the innovation development, highlight the role of innovation intermediary in shaping an urban innovation ecosystem.

While most of these objectives are at least partially achieved, the extent of their realization varies. Efforts to raise awareness, engage communities through urban living labs, and collect input are well-supported through various participatory methods. However, objectives related to co-creation are not consistently matched with appropriate methods or sustained actions, revealing a gap between intention and implementation.

3) What are key drivers and barriers to community participation in FVH open innovation projects?

This study revealed a complex interplay of barriers and drivers affecting community participation in Forum Virium Helsinki's projects. Key barriers include limited project resources and the lack of systemic processes for participation and its methods. Another significant barrier emerged was the COVID-19 pandemic, which shifted many activities online and reduced accessibility and hindered participation overall. In addition, innovations' immaturity, malfunctions, usability issues and lack of immediate or visible benefits. Ensuring

diverse and inclusive participation across diverse demographic groups proved challenging without targeted outreach strategies.

On the other hand, several strong drivers for participation emerged. Participants were often motivated by a desire to contribute to the improvement of their urban environment. Projects offering immediate tangible and personal benefits were particularly effective, especially given the voluntary nature of participation. Ongoing and transparent communication fostered familiarity, trust and a sense of shared ownerships, encouraging long-term engagement. Moreover, this study highlights the importance of embedding participatory activities within existing local structures to lower barriers to entry and to foster a more receptive environment for new initiatives. Lastly, this study found that projects engaging the community in the solution design phase through co-creation workshops were more successful in sustaining participation throughout the later stages as well.

6.2 Implications for Future Research

This study opens multiple opportunities for future research. Most importantly, while the COPP framework was initially conceived as a tool to analyse participation processes from multiple perspectives, including that of the participants, the scope of this study necessitated focusing primarily on the organizer's point of view. Therefore, a significant avenue for future research lies in more directly capturing the experiences of community participants themselves. Investigating how participatory methods are perceived, experienced, and valued by community members would provide a more holistic understanding of the participatory processes within urban open innovation projects. This could involve qualitative studies centred on participant narratives, motivations, and their assessment of the impact of their involvement.

In addition, more comparative research between different types of innovation intermediaries and their practices and between cities could help contextualize the findings of this study. Understanding how different institutional setups, cultural contexts, or funding models influence participatory practices would contribute to the broader development of inclusive urban innovation ecosystems.

Acknowledgements

I would like to express my sincere gratitude to Kerkko Vanhanen for making it possible for me to undertake and complete this thesis. I am also grateful to Matti Hämäläinen for generously offering his time and insights throughout the process.

I would also like to thank all my wonderful colleagues at Forum Virium Helsinki. Your continuous support and encouragement meant the world to me.

Finally, I want to extend my heartfelt thanks to everyone who participated in the interviews and those offered their expertise and assistance along the way. Your contributions were invaluable to this work.

References

Almirall, E., Lee, M., Wareham, J. (2012). Mapping Living Labs in the Landscape of Innovation Methodologies. Technology Innovation Management Review 7.

Andion, C., Alperstedt, G.D. & Graeff, J.F. (2020). Social innovation ecosystems, sustainability, and democratic experimentation: a study in Florianopolis, Brazil. Revista de Administração Pública, v. 54, p. 181-200.

Anttiroiko, A.-V. (2016). City-as-a-Platform: The Rise of Participatory Innovation Platforms in Finnish Cities. Sustainability - ResearchGate, 8(9), 922 (1-31).

Appio, F. P., Lima, M., & Paroutis, S. (2018). Understanding Smart Cities: Innovation ecosystems, technological advancements, and societal challenges. Technological Forecasting and Social Change. doi:10.1016/j.techfore.2018.12

Arnkil, R., Järvensivu, A., Koski, P. & Piirainen, T. (2014). Exploring the Quadruple Helix Report of Quadruple Helix Research For the CLIQ Project. https://www.researchgate.net/publication/262026073

Arnkil, R., Järvensivu, A., Koski, P. & Piirainen, T. (2010). Exploring Quadruple Helix Outlining User-Oriented Innovation Models. Final Report on Quadruple Helix Research for the CLIQ project. University of Tampere.

Arnstein, S. R. (1969). A Ladder of Citizen Participation. Journal of the American Institute of Planners, 35(4), 216–224.

Asheim, B. T., Boschma, R. & Cooke, P. (2011). Constructing regional advantage: Platform policies based on related variety and differentiated knowledge bases. Regional studies, v. 45, n. 7, p. 893-904.

Bans-Akutey, A. & Tiimub, B.M. (2021). Triangulation in Research. Academia Letters, Article 3392. https://doi.org/10.20935/AL3392

Bayar, J. (2023). (In Finnish). *Elinvoimaa esikaupunkialueille – kaupunkiuudistuksen tavoitteet ja eteneminen Helsingissä.* Tutkimus- ja tilastotietoa Helsingistä. Retrieved on June 12, 2024, from: https://kaupunkitieto.hel.fi/fi/elinvoimaa-esikaupunkialueille-kaupunkiuudistuksen-tavoitteet-ja-eteneminen-helsingissa

Bekker, M. & Long, L. (2000). User Involvement in the Design of Human-Computer Interactions: Some Similarities and Differences between Design Approaches. McDonald, S. & Cocton, G., HCI2000: People and Computers XIV, pp. 135-146.

Bhatt, P., Ahmad, A.J. & Roomi, M.A. (2016). Social innovation with open source software: User engagement and development challenges in India. Technovation 2016, 52, 28–39.

B.Green Handbook. (2022). B.Green Handbook: Digital and participatory tools for green infrastructure planning. Forum Virium Helsinki. Retrieved from: https://bgreen-handbook.eu/

B.Green. (n.d.). (In Finnish). Yhteissuunnitteluprosessi. B.Green Handbook. Retrieved from: https://bgreen-handbook.eu/yhteissuunnitteluprosessi/

Bogers, M., Afuah, A. & Bastian, B. (2010), "Users as innovators: a review, critique, and future research directions", Journal of Management, Vol. 36 No. 4.

Bonney, R., Ballard, H., Jordan, R., McCallie, E., Phillips, T., Shirk, J. & Wilderman, C.C. (2009). Public Participation in Scientific Research: Defining the Field and Assessing Its Potential for Informal Science Education. A CAISE Inquiry Group Report; Center for Advancement of Informal Science Education (CAISE): Washington, DC, USA.

Braun, V. & Clarke, V. (2006). Using Thematic analysis in psychology. Qualitative Research in Psychology 3(2), 77–101.

Brown, T. (2008). Thinking like a designer can design thinking. Harvard Business Review, 86(6), 84-93. https://doi.org/10.1016/j.destud.2011.07.006

Bryman, A., & Burgess, R. G. (1999). Analyzing Qualitative Data. London: Routledge.

Buhl, J., von Geibler, J., Echternacht, L. & Linder, M. (2017). Rebound effects in Living Labs: opportunities for monitoring and mitigating re-spending and time use effects in user integrated innovation design. J. Clean. Prod. 151, 592e602.

Bulkeley, H. & Casta, V. (2013). Government by experiment? Global cities and the governing of climate change. Trans. Inst. Br. Geogr. 361–375. https://doi.org/10.1111/j.1475-5661.2012.00535.x

Caloffi, A., Colovic, A., Rizzoli, V., & Rossi, F. (2023). Innovation intermediaries' types and functions: A computational analysis of the literature. *Technological Forecasting and Social Change*, *189*. https://doi.org/10.1016/j.techfore.2023.122351

Cambra-Fierro, J., López-Pérez, M. E., Melero-Polo, I., Pérez, L., & Tejada-Tejada, M. (2023). Smart innovations for sustainable cities: Insights from a public-private innovation ecosystem. Corporate Social Responsibility and Environmental Management. https://doi.org/10.1002/csr.2660

Camboim, G.F., Zawislak, P.A. & Pufal, N.A. (2019). Driving elements to make cities smarter: Evidences from European projects. Technological. Forecasting and Social Change, v. 142, p. 154-167.

Casey, D., & Murphy, K. (2009). Issues in using methodological triangulation in research. Nurse Researcher. 16(4), 40-55.

Chataway, J., Hanlin, R., & Kaplinsky, R. (2014). Inclusive innovation: An architecture for policy development. Innovation and Development, 4(1), 33–54. https://doi.org/10.1080/2157930X.2013.876800

Chesbrough, H.W. (2004). Open Innovation: The New Imperative for Creating and Profiting from Technology. *European Journal of Innovation Management*, *7*(4), 325–326. https://doi.org/10.1108/14601060410565074

Chesbrough, H. W. (2003). The era of open innovation. MIT Sloan Management Review, 44 (3), 35-41.

Chess, C. (2000). Evaluating Environmental Public Participation: Methodological Questions. Journal of Environmental Planning and Management, 43(6), 769–784. doi:10.1080/09640560020001674

Chu, Z., Cheng, M., & Yu, N. (2022). Development potential of Chinese smart cities and its spatio-temporal pattern: A new hybrid MADM method using combination weight. Growth and Change, 53, 1546–1566.

City of Helsinki. (n.d.-a). (In Finnish). Kaupunkiympäristö ja liikenne: Jätkäsaari. Retrieved on June 12, 2024, from: https://www.hel.fi/fi/kaupunkiymparisto-ja-liikenne/kaupunkisuunnittelu-ja-rakentaminen/uutta-helsinkia-rakentamassa/jatkasaari

City of Helsinki. (n.d.-b). (In Finnish). *Kaupunkiympäristö ja liikenne: Kalasatama*. Retrieved on June 12, 2024, from: https://www.hel.fi/fi/kaupunkiymparisto-ja-liikenne/kaupunkisuunnittelu-ja-rakentaminen/uutta-helsinkia-rakentamassa/kalasatama

City of Helsinki. (n.d. -c). (In Finnish). Päätöksenteko ja hallinto: Stadiluotsit. Retrieved on July 3, 2024, from: https://www.hel.fi/fi/paatoksenteko-ja-hallinto/osallistu-ja-vaikuta/tukea-yhdessa-tekemiseen/stadiluotsit

City of Helsinki. (2018). (In Finnish). Osallisuusmalli yleisesitys 2018 [Participation model, general presentation 2018]. Retrieved on June 26, 2024, from: https://www.hel.fi/static/liitteet/kanslia/asukasyhteistyo/osallisuusmalli-yleisesitys-2018.pdf

City of Helsinki. (2020). Participation and interaction model. Retrieved on June 26, 2024, from: https://www.hel.fi/en/decision-making/get-involved/information-about-participation-in-helsinki

City of Helsinki. (2022). (In Finnish). Tule mukaan kehittämään hel.fi-sivuja - liity kehittäjäyhteisöön. Updated May 22, 2024. Retrieved on June 26, 2024, from: https://www.hel.fi/fi/uutiset/tule-mukaan-kehittamaan-helfi-sivuja-liity-kehittajayhteisoon

Compagnucci, L., Spigarelli, F., Coelho, J., & Duarte, C. (2021). Living Labs and user engagement for innovation and sustainability. *Journal of Cleaner Production*, *289*. https://doi.org/10.1016/j.jclepro.2020.125721

Damanpour, F. (1996). "Organizational complexity and innovation: developing and testing multiple contingency models", Management Science, Vol. 42 No. 5, pp. 693-716.

Dameri, R. P. (2015). Smart city intellectual capital: an emerging view of territorial systems innovation management. Journal of Intellectual Capital, Vol. 16, Iss. 4, 860-887.

Davidson, S. (1998). Spinning the wheel of empowerment. Planning 3: 14 –15.

Dhanaraj, C., & Parkhe, A. (2006). Orchestrating innovation networks. Academy of Management Review, 31(3), 659-669.

Dorst, K. (2011). The core of 'design thinking' and its application. Design Studies, 32(6), 521-532. https://doi.org/10.1016/j.destud.2011.07.006

Dubois, A., & Gadde, L.-E. (2002). Systematic combining: an abductive approach to case research. Journal of Business Research (Vol. 55). 553-560.

Eason, K. (1987). Information Technology and Organizational Change. London: Taylor and Francis.

Eriksson, P. & Kovalainen, A. (2008). Qualitative Methods in Business Research. London, SAGE Publications.

European Commission. (2013). "The Dublin Innovation Declaration" Manifesto: Ten Point Declaration to Create More Wealth, Better Welfare and Improved Well-being with Open Innovation 2.0. Digital Single Market ([WWW Document]).

European Network of Living Labs. What are Living Labs. Available online: https://enoll.org/about-us/ (accessed on 20 May 2024).

Fagerberg, J., Fosaas, M., & Sapprasert, K. (2012). Innovation: Exploring the knowledge base. Research Policy, 41(7), 1132–1153. https://doi.org/10.1016/j.respol.2012.03.008

Fagerholm, N., Rayond, C.M., Olafsson, A.S., Brown, G., Rinne, T., Hasanzadeh, K., Broberg, A. & Kyttä, M. (2021). A methodological framework for analysis of

participatory mapping data in research, planning, and management. International Journal of Geographical Information Science.

Federley, M., Friedrich, P., & Karlsson, A. (2014). SubUrbanLab: D 2.1 Boundary conditions for successful Urban Living Labs.

Feldman, M., Guy, F., & Iammarino, S. (2021). Regional income disparities, monopoly and finance. Cambridge Journal of Regions, Economy and Society, 14(1), 25–49. https://doi.org/10.1093/cjres/rsaa024

Fiksu Kaupunki. (n.d. -a). Agile Piloting. Retrieved on June 24, 2024, from: https://fiksukaupunki.fi/toolbox/agile-piloting/

Fiksu Kaupunki. (n.d. -b). Design Sprints. Retrieved on June 26, 2024, from: https://fiksukaupunki.fi/toolbox/design-sprints/

Fiksu Kaupunki. (2021). Green Pop-Ups. Toolbox. Retrieved on December 3, 2024, from: https://fiksukaupunki.fi/toolbox/green-pop-ups/

Fischer, L.-B. & Newig, J. (2016). Importance of actors and agency in sustainability transitions: a systematic exploration of the literature. Sustainability 8 (5), 476.

Fischer, F. (2012). Participatory Governance: From Theory to Practice. In The Oxford Handbook of Governance; OUP Oxford: Oxford, UK. https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199560530.001.0001/oxfordhb-9780199560530-e-32

Forum Virium Helsinki. (n.d. -a). About us. Retrieved on February 8, 2024, from: https://forumvirium.fi/esittely/tietoa-meista/

Forum Virium Helsinki. (n.d. -b). MUV – more sustainable mobility choices with gamification. Retrieved on January 17, 2025, from: https://forumvirium.fi/en/projects/muv-more-sustainable-mobility-choices-with-gamification/

Forum Virium Helsinki. (2024). (In Finnish). Kehitämme yhdessä tulevaisuuden kaupunkiratkaisuja [PowerPoint slides]. Internal document.

Fuglsang, L., & Hansen, A. V. (2022). Framing improvements of public innovation in a living lab context: Processual learning, restrained space and democratic engagement. Research Policy, 51(1). https://doi.org/10.1016/j.respol.2021.104390

Fung, A. (2006). Varieties of participation in complex governance. Public Administration Review 66: 66–75.

Fung, A. (2003). Recipes for Public Spheres: Eight Institutional Design Choices and Their Consequences. Journal of Political Philosophy, 11(1), 338–367.

Gasco-Hernandez, M., Sandoval-Almazan, R., & Gil-Garcia, J. R. (2017). Open innovation and co-creation in the public sector: Understanding the role of intermediaries. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, *10429 LNCS*, 140–148. https://doi.org/10.1007/978-3-319-64322-9_12

Gazaro dos Santos, D. A., Carneiro Zen, A., Bittencourt, B. A., & Boari, C. (2022). Orchestration of Actors and Resources for the Development of Urban Innovation Ecosystems.

Van Geenhuizen, M. (2019). Applying an RRI filter in key learning on urban living labs' performance. Sustainability 11 (14), 3833.

Godin, B. (2005). The linear model of innovation: the historical construction of an analytical framework. In: Project on the History and Sociology of S&T Statistics. Working Paper No. 30. https://doi.org/10.1007/BF02832074

Godin, B. & Lane, J.P. (2013). Pushes and pulls: hi(s)tory of the demand pull model of innovation. Sci.Technol.Hum.Values 38 (5), 621–654. https://doi.org/10.1177/0162243912473163

Granstrand, O. & Holgersson, M. (2020). Innovation ecosystems: A conceptual review and a new definition. https://doi.org/10.1016/j.technovation.2019.102098

Guo, J., Fu, Y., & Sun, X. (2023). Green innovation efficiency and multiple paths of urban sustainable development in China: multi-configuration analysis based on urban innovation ecosystem. *Scientific Reports*, *13*(1). https://doi.org/10.1038/s41598-023-40084-x

Göbel, C., Nold, C., Berditchevskaia, A. & Haklay, M. (2019). How Does Citizen Science 'Do' Governance? Reflections from the DITOs Project. Citiz. Sci. Theory Pract. 2019, 4. [CrossRef]

Halcomb, E., & Andrew, S. (2005). Triangulation as a method for contemporary nursing research. Nurse Researcher, 13(2), 71-82.

Hartley, J. (2005). Innovation in governance and public services: past and present. Public Money & Manag. 25, 27–34.

Hassenforder, E., Smajgl, A., & Ward, J. (2015). Towards understanding participatory processes: Framework, application and results. Journal of Environmental Management, 157, 84–95. https://doi.org/10.1016/j.jenvman.2015.04.012

Helsingin kaupunki. (2024). (In Finnish). Kaupunkiuudistuksen kokonaisuus. Retrieved on November 10, 2024, from: https://www.hel.fi/fi/paatoksenteko-ja-hallinto/tietoa-

helsingista/kaupunkiuudistus/kaupunkiuudistuksen-kokonaisuus#miksi-juuri-nama-alueet-

Helsinki Living Lab. (n.d.). Helsinki Living Lab. Convergence of Enablers, Utilizers, Developers and Users. *Flyer*.

Von Hippel, E. (2005). Democratizing Innovation. MIT Press. https://doi.org/10.7551/mitpress/2333.001.0001

Hodson, E., Vainio, T., Sayún, M. N., Tomitsch, M., Jones, A., Jalonen, M., Börütecene, A., Hasan, M. T., Paraschivoiu, I., Wolff, A., Yavo-Ayalon, S., Yli-

Hossain, M., Leminen, S. & Westerlund, M. (2019). A systematic review of living lab literature. J. Clean. Prod. 213, 976e988. https://doi.org/10.1016/j.jclepro.2018.12.257

Howells, J. (2006). Intermediation and the role of intermediaries in innovation. *Research Policy*, *35*(5), 715–728. https://doi.org/10.1016/j.respol.2006.03.005

Hurmerinta-Laukkanen, P. & Nätti, S. (2018). Orchestrator types, roles and capabilities - A framework for innovation networks. Industrial Marketing Management, 74, 65-78. http://dx.doi.org/10.1016/j.indmarman.2017.09.020

Ibert, O., Hautala, J. & Jauhiainen, J. S. (2015). From cluster to process: New economic geographic perspectives on practices of knowledge creation. Geoforum, 65, 323-327.

IMEC, SANT, AIV, FVH, TEC, AGE, & UH. (2021). User engagement guidebook and strategy for senior citizens (Deliverable D2.2). URBANAGE: Enhanced urban planning for age-friendly cities through disruptive technologies (Grant Agreement No. 101004590). IMEC. https://www.urbanage.eu

Innes, J. E., & Booher, D. E. (1999). Consensus Building and Complex Adaptive Systems: A Framework for Evaluating Collaborative Planning. Journal of the American Planning Association, 65(4), 412.

Jauhiainen, J. & Hooli, L. (2019). Innovation for development in Africa. 1st ed. Oxford: Routledge, 2020. Web.

Jiang, H., Geertman, S., & Witte, P. (2022). Smart urban governance: An alternative to technocratic "smartness." GeoJournal, 87(3), 1639–1655. https://doi.org/10.1007/s10708-020-10326-w

Joneikifi. (2020, March 6). Aerial view of Kalasatama region of Helsinki, Finland [Photograph]. Wikimedia Commons.

Jäntti, A., Paananen, H., Kork, A.-A., & Kurkela, K. (2023). Towards interactive governance: Embedding citizen participation in local government. Administration & Society, 1–26. https://doi.org/10.1177/00953997231177220

Kallinen, T. & Kinnunen, T. (n.d.). Etnografia. Teoksessa Jaana Vuori (toim.) Laadullisen tutkimuksen verkkokäsikirja. Tampere: Yhteiskuntatieteellinen tietoarkisto [ylläpitäjä ja tuottaja]. Retrieved on February 2, 2024, from: https://www.fsd.tuni.fi/fi/palvelut/menetelmaopetus/

Karlsson, A. & Kildsgaard, I. (2012). Strategy for Multi-stakeholder dialogue on green urban climate adaptation. IVL.

Karmala, J. (2021). (In Finnish). Kokeilujoukot osallistaa helsinkiläisiä kehittämään tulevaisuuden älykkäitä ratkaisuja. Forum Virium Helsinki. Retrieved on June 24, 2024, from: https://forumvirium.fi/liity-kokeilujoukot/

Kauhaluoma, S., & Young, G. W. (2023). Evaluating Social Impact of Smart City Technologies and Services: Methods, Challenges, Future Directions. Multimodal Technologies and Interaction, 7(3). https://doi.org/10.3390/mti7030033

Kaulio, MA. (1998). Customer, Consumer and User Involvement in Product Development: A Framework and a Review of Selected Methods. Total Quality Management 9 (1) 141-150.

Kivimaa, P. (2014). Government-affiliated intermediary organisations as actors in system-level transitions. Res. Policy 43 (8), 1370–1380.

Kivimaa, P., Boon, W., Hyysalo, S., & Klerkx, L. (2019). Towards a typology of intermediaries in sustainability transitions: A systematic review and a research agenda. *Research Policy*, *48*(4), 1062–1075. https://doi.org/10.1016/j.respol.2018.10.006

Kola, S., Koivukoski, U., Koponen, L. & Heino, M. (2020). Ecosystem Handbook. The ART of Leading and Creating IMPACT. Helsinki: Alma Talent Oy.

Kuhlmann, S. & Rip, A. (2014). The Challenge of Addressing Grand Challenges.

Kuokkanen, K., & Palonen, E. (2018). Post-political development and emancipation: Urban participatory projects in Helsinki. In S. Knierbein & T. Viderman (Eds.), Public space unbound: Urban emancipation and the post-political condition (pp. 99-112). Routledge. https://doi.org/10.4324/9781315449203

Laine, Markus & Jarkko Bamberg & Pekka Jokinen. (2007b). (In Finnish). Tapaustutkimuksen käytäntö ja teoria. Teoksessa Markus Laine & Jarkko Bamberg & Pekka Jokinen (toim.) Tapaustutkimuksen taito. Helsinki: Gaudeamus, 9–38.

Lee, N. (2023). Inclusive innovation in cities: from buzzword to policy, Regional Studies, DOI: 10.1080/00343404.2023.2168637

Leminen, S., Niitamo, V.-P. & Westerlund, M. (2017). A brief history of living labs: from scattered initiatives to global movement. In: Open Living Labs Day Conference.

Leminen, S. & Westerlund, M. (2016). A framework for understanding the different research avenues of living labs. Int. J. Technol. Market. 11 (4), 399–420.

Leminen, S. & Westerlund, M. (2017). Categorization of Innovation Tools in Living Labs. Technol. Innov. Manage. Rev. 7, 1.

Liu, D., Zhao, M., Xu, M., & Mehrgan, M. (2021). A new model to investigate the impact of innovative IT services on smart urban growth: The mediating role of urban planners' knowledge. Growth and Change, 52, 1040–1061.

Lumineau, F. & Oliveira, N. (2018). A pluralistic perspective to overcome major blind spots in research on interorganizational relationships. Academy of Management Annals, 12: 440-465.

Luoma, K., Hargrave, A. R., Poom, A., Fung, P. L., Ovaska, A., Kulonpalo, J., Limo, J., Väkevä, O., Niemi, J., Kousa, A., Nousiainen, V., Reittu, N., Leino, M., & Johansson, L. (n.d.). Final Report – Effects of HOPE. UIA03-240 HOPE. 21.

Malerba, F. (2009). Increase learning, break knowledge lock-ins and foster dynamic complementarities: evolutionary and system perspectives on technology policy in industrial dynamics. In: Foray, D. (Ed.), The New Economics of Technology Policy. Edward Elgar, pp. 33–45.

Marshall, C., & Rossman, G. (2006). Designing qualitative research, (4th ed.). Thousand Oaks, CA: Sage Publications.

Matschoss, K. & Heiskanen, E. (2017). Making it experimental in several ways: The work of intermediaries in raising the ambition level in local climate initiatives. Journal of Cleaner Production 169, 85–93.

Maxwell, J. A. (2013). Qualitative research design: An interactive approach (3rd ed.). Sage Publications.

McCann, P., & Ortega-Argilés, R. (2013). Modern regional innovation policy. Cambridge Journal of Regions, Economy and Society, 6(2), 187–216. https://doi.org/10.1093/cjres/rst007

Menny, M., Voytenko Palgan, Y., & McCormick, K. (2018). Urban living labs and the role of users in co-creation. *GAIA - Ecological Perspectives for Science and Society*, *27*, 68–77. https://doi.org/10.14512/gaia.27.s1.14

Mustonen, V., Spilling, K. & Bergström, M. (n.d.). Recipes for Agile Pilots. Cook Book. Forum Virium Helsinki.

Newig, J. & Kvarda, E. (2012). Participation in environmental governance: legitimate and effective?. In: Environmental Governance. The Challenge of Legitimacy and

Effectiveness, Issue January. Edward Elgar, pp. 89–108. https://doi.org/10.4337/9781849806077.00013

Noble, N. & Heale, R. (2019). Triangulation in research, with examples. BMJ Journals, 22(3). Retrieved on February 8, 2024, from: https://ebn.bmj.com/content/22/3/67

Nyström, A. G., Leminen, S., Westerlund, M., & Kortelainen, M. (2014). Actor roles and role patterns influencing innovation in living labs. Industrial Marketing Management, 43(3), 483–495. https://doi.org/10.1016/j.indmarman.2013.12.016

Pedersen, K. (2020). What can open innovation be used for and how does it create value? *Government Information Quarterly*, *37*(2). https://doi.org/10.1016/j.giq.2020.101459

Partanen, P. (n.d.). The anatomy of a successful development project. Forum Virium Helsinki. Retrieved from: https://forumvirium.fi/en/projects/the-anatomy-of-a-successful-development-project/

Philip, L. J. (1998). Combining quantitative and qualitative approaches to social research in human geography—an impossible mixture?. Environment and planning A, 30(2), 261-276.

Pikkarainen, M., Ervasti, M., Hurmelinna-Laukkanen, P. & Nätti, S. (2017). Orchestration roles to facilitate networked innovation in a healthcare ecosystem. Technology Innovation Management Review, 7 (9), 30-43. http://doi.org/10.22215/timreview/1104

Porter, M. E., & Kramer, M. R. (2011). Creating shared value: How to reinvent capitalism—and unleash a wave of innovation and growth. Harvard Business Review. Retrieved from: https://www.communitylivingbc.ca/wp-content/uploads/2018/05/Creating-Shared-Value.pdf

Randhawa, K., Wilden, R., & Hohberger, J. (2016). A Bibliometric review of open Innovation: Setting a research agenda. The Journal of Product Innovation Management, 33(6), 750–772.

Reypens, C., Lievens, A., & Blazevic, V. (2021). Hybrid Orchestration in Multi-stakeholder Innovation Networks: Practices of mobilizing multiple, diverse stakeholders across organizational boundaries. Organization Studies, 42(1), 61-83.

Rowe, G. & Frewer, L.J. (2000). Public participation methods: a framework for evaluation. Sci.Technol.Hum.Values 25 (1), 3–29. https://doi.org/10.1177/016224390002500101

Rowe, G., & Frewer, L. J. (2004). Evaluating Public-Participation Exercises: A Research Agenda. Science Technology And Human Values, 29(4), 512–556. http://sth.sagepub.com/cgi/doi/10.1177/0162243903259197

Ruhlandt, R. W. S. (2018). The governance of smart cities: A systematic literature review. Cities, 81, 1–23.

Santos, D. A. G., Zen, A. C., & Bittencourt, B. A. (2021). From governance to choreography: coordination of innovation ecosystems. Innovation & Management Review.

Schumpeter, J. A. (1934). The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle. Harvard University Press.

Schumpeter, J. A. (1939). Business cycles: A theoretical, historical, and statistical analysis of the capitalist process. McGraw-Hill.

Schuurman, D., De Marez, L., & Ballon, P. (2013). Open innovation processes in living lab innovation systems: Insights from the LeYLab. Technology Innovation Management Review, 3(11), 28-37.

Schütz, F., Heidingsfelder, M. L., & Schraudner, M. (2019). Co-shaping the Future in Quadruple Helix Innovation Systems: Uncovering Public Preferences toward Participatory Research and Innovation. *She Ji*, *5*(2), 128–146. https://doi.org/10.1016/j.sheji.2019.04.002

Schot, J., Kanger, L. & Verbong, G.P.J. (2016). The roles of users in shaping transitions to new energy systems. Nat. Energy 1 (2016), 1–7. https://doi.org/10.1038/nenergy.2016.54

Selwyn, N. (2003). Apart from Technology: Understanding People's Non-Use of Information and Communication Technologies in Everyday Life. Technology in Society, Vol. 25, No. 1, pp. 99-116.

Serra, A. (2014). Three problems concerning living labs: A European point of view. Revista Iberoamericana de Ciencia, Tecnología y Sociedad, 8(23), 283–298.

Social Sciences Research Laboratories SSRL. (2018). Using Triangulation to Improve Credibility and Validity [Video]. YouTube. https://www.youtube.com/watch?v=apcn0r3fL1o

Sorri, K., Yrjönkoski, K., & Seppänen, M. (2024). Smart cities, smarter values: Unpacking the ecosystem of urban innovation. Technology in Society, 77, Article 102499. https://doi.org/10.1016/j.techsoc.2024.102499

Sørensen, E., & Torfing, J. (2011). Enhancing collaborative innovation in the public sector. Administration and Society, 43(8), 842–868.

Spilling, K., & Puomio, S. (Eds.). (2023). (In Finnish). Fiksua kaupunkia kehittämässä: Työkaluja kaupunkikehittäjille. Fiksu Kaupunki – Helsinki Innovation Districts.

Spilling, K., Rinne, J. & Hämäläinen, M. (2019). Proceedings of the OpenLivingLab Days Conference. European Network of Living Labs.

Spilling, K. & Rinne, J. (2020). Pocket Book for Agile Piloting. Facilitating co-creative experimentation. Forum Virium Helsinki.

Spinosa, L.M. & Balbinot, Z. (2022). The interplay between urban innovation ecosystems and sustainable development. Open Science Research. Vol 1. DOI: 10.37885/220107521

Stake, R. E. (2005). Qualitative case studies. In Denzin, N. K. & Lincoln, Y. S. (eds.) The SEGE handbook of qualitative research, 443-466. 3rd ed. SAGE, Thousand Oaks, CA.

Stanley, I., Glennie, A., & Gabriel, M. (2018). How inclusive is innovation policy? National Endowment for Science, Technology and the Arts (NESTA).

Stewart, J. & Hyysalo, S. (2008). Intermediaries, users and social learning in technological innovation. Int. J. Innov. Manag. 12 (03), 295–325.

Stewart-Withers, R., Banks, G., Mcgregor, A., & Meo-Sewabu, L. (2016). Qualitative Research. In *Development Field Work: A Practical Guide* (pp. 59–80). SAGE Publications, Ltd. https://doi.org/10.4135/9781473921801.n4

Stilgoe, J., Owen, R. & Macnaghten, P. (2013). Developing a framework for responsible innovation. Res. Policy 2013, 42, 1568–1580.

Ståhlbröst, A. (2008). Forming Future IT – The Living Lab Way of User Involvement. Doctoral Thesis. Luleå University of Technology.

Ståhlbröst, A. (2012). A set of key principles to assess the impact of Living Labs. Int. J. Prod. Dev. 17.1-2 (2012):60–75.

Sultana, F. (n.d.). *Reflexivity, Positionality and Participatory Ethics: Negotiating Fieldwork Dilemmas in International Research*.

Suomen Ilmakuva Oy. (2016). (In Finnish). Jätkäsaari in Helsinki, Finland, 2016.jpg [Valokuva]. Helsingin kaupunginmuseo. Finna: Länsisatama ja Jätkäsaari koillisesta kuvattuna, etualalla laivoja Jätkäsaaren laiturissa, oikealle jäävä kapea vesiväylä on Ruoholahden kanava.

Tellis, W. (1997). Introduction to Case Study. The Qualitative Report 3(2).

Toivari, E. (Photographer). (2002). Malmin rautatieasema [Photograph]. Helsinki City Museum.

UIA Initiative. (n.d.). UIA cities: Helsinki. Retrieved from: https://www.uia-initiative.eu/en/uia-cities/helsinki

UNIDO. (2019). Bridge for Cities 4.0. Retrieved from: https://www.unido.org/sites/default/files/files/2019-09/Bridge4Cities%20Issue%20Paper_Final.pdf

United Nations. (2018). World urbanization prospects: The 2018 revision, key facts. Department of Economic and Social Affairs, Population Division. (2018). Retrieved from: https://population.un.org/wup/Publications/Files/WUP2018-KeyFacts.pdf

Uyarra, E., Ribeiro, B., &Dale-Clough, L. (2019). Exploring the normative turn in regional innovation policy: Responsibility and the quest for public value. European Planning Studies, 27(12), 2359–2375. https://doi.org/10.1080/09654313.2019.1609425

Vaisnore, A., & Petraite, M. (2011). Customer Involvement into Open Innovation Processes: a Conceptual Model. Social Sciences, 73(3). https://doi.org/10.5755/j01.ss.73.3.793

Valkokari, K. (2015). Business, innovation, and knowledge ecosystems: how they differ and how to survive and thrive within them, Technology Innovation Management Review 5. 5–12, https://doi.org/10.22215/timreview/919

Veeckman, C., Schuurman, D., Leminen, S., & Westerlund, M. (2013). Linking Living Lab Characteristics and Their Outcomes: Towards a Conceptual Framework. *Technology Innovation Management Review*, *3*(12), 6–15. https://doi.org/10.22215/timreview/748

Veeckman, C. & Temmerman, L. (2021). Urban Living Labs and Citizen Science: From Innovation and Science towards Policy Impacts. Sustainability 2021, 13, 526. https://doi.org/10.3390/su13020526

Voytenko, Y., McCormick, K., Evans, J., & Schliwa, G. (2016). Urban living labs for sustainability and low carbon cities in Europe: Towards a research agenda. Journal of Cleaner Production, 123.

West, J., & Bogers, M. (2014). Leveraging external sources of innovation: A review of research on open innovation. Journal of Product Innovation Management, 31(4), 814–831. https://doi.org/10.1111/jpim.12125

Wigginton, N., Fahrenkamp-Upperbrink, J., Wible, B., & Malakoff, D. (2016). Cities are the future. Science, 352, 904–905.

Young, O. R. (2008). Institutions and Environmental Change: The Scientific Legacy of a Decade of IDGEC Research. In Institutions and Environmental Change, Principal Findings, Applications, and Research Frontiers (pp. 3–45). Cambridge, London: MIT Press.

Äyväri, A. (2021). (In Finnish). Innovaatioekosysteemin orkestrointi. In T. Hirvikoski, T., Äyväri, A., Lahtinen, H., Merimaa, M. & Saastamoinen, K. (Eds.) Eurooppalainen

korkeakoulu osallistavan tutkimus-, kehittämis- ja innovaatiotoiminnan mahdollistaja-orkestroijana. Innovaatioekosysteemin näkökulma monitoimijaiseen yhteiskehittämiseen. Laurea-ammattikorkeakoulu, Laurea Julkaisut 183.