Service design for soundscapes

A case study in Copenhagen showing how service design methods can assist city makers by facilitating soundscape thinking

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I. Abstract

This thesis explores how service design methods can assist city makers understand and apply soundscape thinking for the places they are working on. This thesis aims to contribute and expand the understanding of service design and its value in relation to working with soundscapes. The thesis conclusions arise from two workshops. The first workshop was conducted with city-makers from an international urban design and research consultancy in Copenhagen, while the second workshop was conducted with the main users of the service case in the field. The thesis concludes by suggesting the use of a journey map and a service blueprint in which there is an additional section about soundscapes in order to research, design, manage and adjust services contemplating the soundscapes associated to the service touchpoints. Furthermore, in order to map the current state of those soundscapes associated with each touchpoint and later sketch desired future states of them, the thesis proposes a toolkit to facilitate soundscape thinking. This toolkit is intended as a shared vocabulary in order to be able to map and sketch soundscapes associated with service touchpoints from a people-centered perspective.

Keywords
Service Design, Soundscapes, Soundscape Thinking, City Making

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1. INTRODUCTION

1.1 Introduction and motivations

Dear service systems designers: soundscapes matter. As Michael Kimmelman's New York time article (Kimmelman, 2022) reminds architects to reflect about how the places they design sound, I also believe it is important to reflect as service systems designers on how the service systems we design sound. It is therefore why with this thesis, I would like to provide the service design community with new knowledge about how service design methods can facilitate soundscape thinking for city makers and in this way show how soundscape thinking could be included in the service design process. My goal and hope are to support this new knowledge with relevant academic resources and practical experience.

Before this master's program, I learned to appreciate sound and soundscapes through academic training on studies in the fields of sound, acoustics, music, and audiovisual design. This appreciation towards soundscapes grew even stronger while working professionally as a sound engineer for the music industry and as a sound designer for the international film industry. Further exploring the relationship between sound, health and wellbeing, I have studied and practiced Yoga's tradition of oral transmission of knowledge by studying the Yoga Sutras (Moors & Patañjali., 2012), Vedic Chanting (Mantravallī, 2012) and mantras practices following the T. Krishnamacharya tradition (Desikachar et al., 2005). These academic, professional and personal experiences made me aware of the challenges many design practices face when trying to contemplate sound or soundscapes in their design process. It also grew noticeable the challenges cities, and its people, face towards soundscapes in relation to health, well being, socially, and sustainability. At the same time, it became clear to me that there is a gap between city makers' practice and the application of soundscape thinking in the city making process, especially when contemplated from a people's health and well-being point of view. On the other hand, designing soundscapes is an elaborate design process, normally an ill-defined or open problem area, that involves a variety of actors. City makers, to my current knowledge, lack a common soundscape vocabulary and simple methods in order to include soundscape thinking in the design process of making cities. Service designers, as city makers, face the same challenge in relation to including soundscape thinking into the service design process (Kustrak Korper et al., 2020). However, I believe service design can help narrow this gap while at the same time learn how to include soundscape thinking in the service design process. Hence the hypothesis behind this thesis is as follows: If service design can facilitate soundscape thinking to city makers, then city makers could contemplate soundscapes in their design process; and service designers would be able to design services contemplating the soundscapes associated with the service they are designing for. Consequently, the research question this thesis explores is: how might service design help city makers understand and apply soundscape thinking for the places they are working on?

Service design is recognized for bringing to organizations a people-centered, and in some cases a life-centered approach, to design practices, breaking silos, and embracing wicked or ill-defined problems while thriving innovation (Stickdorn et al., 2020) (Polaine et al., 2013) (Kimbell, 2017) (Reason et al., 2016) (Owens, 2022). Through this Master's program, we learned how service design methods are a key part of thriving innovation and the responsibilities we, as service systems designers, have in our practice. Through this thesis, I wish to contribute to a responsible and ethical service design practice towards social and sustainable innovation (Manzini, 2015) within soundscape thinking.

Over the years of service design practice, the human sense of sight and visual aesthetics have been the main focus of service designers (Kustrak Korper et al., 2020). Many design practices, like city making, have also focused mainly on the visual sense of humans, setting aside the other human senses, for example, hearing. This can be observed when, for example, searching articles in the Service Design Network's website using the keyword 'Sound' (SDN | Touchpoint Articles, 2022) or 'Soundscapes' (SDN | Touchpoint Articles, 2022). The number of articles related to sound or soundscapes appearing in the search results is zero, as shown in appendices A and B. Sound is an important aspect of life, the sound environment influences people's experiences, behaviors, health, and well-being (Radicchi et al., 2020) (Thorsen, 2021) (Cerwén, 2017) (Kang & Schulte-Fortkamp, 2016) (Schafer, 1994) (Sørensen et al., 2013) (Sørensen et al., 2012) (Sørensen et al., 2011) ("International Noise Awareness Day", 2022). In the last few hundred years, people went from using sounds and our interaction with soundscapes from an active way to a passive defensive way (Schafer, 1994) and this includes the way we currently practice service design and city making (Kang & Schulte-Fortkamp, 2016).

In this thesis, I would like to explore the use of service design methods to facilitate soundscape thinking for city makers. While soundscapes are important for life, people's experiences, health, and well-being; we service designers and other designers, like city makers, lack a common vocabulary and simple methods in order to reflect and contemplate soundscapes in the design process. This gap makes service designers and city makers tend to avoid the contemplation of the associated soundscapes or having a soundscape thinking approach to the built environments involved in their design process. Consequently, the outcome of those design processes have a low fidelity from a soundscape perspective (Schafer, 1994). There are a few exceptions to this situation, like designers well trained and skilled in sound and soundscapes, for example sound designers, acoustic designers or other designers with a background in sound studies. Unfortunately, these are still exceptional cases, hence the purpose of this thesis and hope to support some improvement in this matter.

For the case of this thesis, I decided to dedicate it to the topic of city-making. Cities are the places where soundscapes have changed the most through human history, sadly in most cases for the worst (Schafer, 1994). Even so, more people live in cities every year, a

trend that is likely to continue for many years ("Demographics 2.0 - Arup Foresight", 2022), increasing the amount of people impacted by the city's soundscapes annually.
City-makers, as many other designers, lack a common vocabulary and simple methods to include soundscape thinking in their design practice. This absence negatively impacts city makers' reflective and decision making process in relation to soundscapes, therefore the soundscapes associated with the built environments they design and the consequently impact of those on the experience, behavior, health, and well-being of people part of them. This is why I would like to apply my service design skills to help city-makers better understand, have a shared vocabulary and methods to include soundscape thinking in their design process. My hope is that these methods would allow city makers to have the opportunity to make cities with healthier, equitable and sustainable soundscapes that enhance people's well being. In order to do so, I closely collaborated with the research and development team of an international urban strategy, design and research consultancy based in Copenhagen. This consultancy offers expertise in the fields of architecture, urban design, landscape architecture, and city planning ("Approach - Gehl", 2022).

1.2 Learning objectives

The learning objectives of the thesis are based on both official learning objectives defined by Aalborg University, as well as my personal learning objectives. The purpose of the thesis is to demonstrate the competences, skills and knowledge that I am expected to possess as a service system designer. The personal learning objectives reflect my personal areas of interests, where and how I, as service systems designer, wish to contribute to the field.

1.2.1 Academic objectives

The official learning objectives ("Kandidatspeciale (2019/2020)", 2022) are as follows:

Knowledge – students who complete the module will obtain the following qualifications:

> Must have knowledge about the possibilities to apply appropriate methodological approaches to specific study areas.
>
> Must have knowledge about design theories and methods that focus on the design of advanced and complex product-service systems.

Skills – students who complete the module will obtain the following qualifications:

> Must be able to work independently, to identify major problem areas (analysis) and adequately address problems and opportunities (synthesis).

Must demonstrate the capability of analyzing, designing and representing innovative solutions.

Must demonstrate the ability to evaluate and address (synthesis) major organizational and business issues emerging in the design of a product-service system.

Competences – students who complete the module will obtain the following qualifications:

Must be able to master design and development work in situations that are complex, unpredictable and require new solutions (synthesis).

Must be able to independently initiate and implement discipline-specific and interdisciplinary cooperation and assume professional responsibility (synthesis).

Must have the capability to independently take responsibility for own professional development and specialization (synthesis).

1.2.2 Personal objectives

My personal learning objectives are formulated based on my motivation towards this thesis project:

Expand my theoretical and practical knowledge about how service design can facilitate soundscape thinking to help city makers understand, design and build healthier soundscapes.

Conduct a research contribution that motivates people, primarily service systems designers and city makers, to include soundscape thinking in their design processes towards healthier, equitable and sustainable environments that enhance people's well being.

Contribute to further expand the understanding of service systems design and the role of service systems designers towards meaningful soundscapes design for everyone.

1.3 Reading Guide

The reading guide presents an overview of the thesis and its chapters.

2. LITERATURE REVIEW

Introduces the theoretical foundation of the thesis, which leads towards the research question. Presents service design, including the value service design provides and the role of service designers. Introduces soundscape thinking in city making, including how soundscapes impact people's life and what soundscape thinking is. It concludes providing an overview on what service design has so far done with regard

to sound and soundscapes and lastly introducing the research question of this thesis.

3. METHODOLOGY
Introduces the project context and its general approach. Then introduces the methods that were used to explore the academic research question in ‘Phase one’: service design methods adapted for soundscape thinking and ‘phase two’: a workshop with city makers and a workshop with users in the field. It concludes by presenting the ethical approach used for this thesis.

4. CASE STUDY
Documents the process of exploring the academic research question of this thesis. It starts by introducing the assumption-based service case which was used to explore and adapt service design tools and methods for soundscape thinking. Following it will introduce the process of exploring which and how to adapt service design tools and methods for soundscape thinking. It would continue by presenting the facilitated workshops, one with city makers and the other with users in the field. Lastly, it would conclude with the presentation of the learnings to city makers.

5. DISCUSSION
The academic research question of the thesis is discussed based on the key findings of the case study. Further reflections from the design process and the research question are presented, finalizing with reflections from the learning objectives of this thesis.

6. CONCLUSION
Presents the conclusive reflections on the research question, the key findings as well as the limitations of this thesis work and potential future studies within the topic.

2. LITERATURE REVIEW

In order to introduce the theoretical foundation of this thesis, which leads towards the research question, I conducted a literature review. It includes literature from both academics and practitioners as well as from the fields of service design, soundscapes and other fields of studies. The purpose of this literature review is not to fully exhaust these topics, as it's simply not possible within the scope of this thesis, but instead to focus on some of the concepts relevant to the work presented here. The literature review presents service design, including the value service design provides and the role of service designers. Introduces soundscape thinking in city making, including how soundscapes impact people's life and what soundscape thinking is. It concludes providing an overview on what service design has so far done with regard to sound and soundscapes and lastly introducing the research question of this thesis.

Literature review sub-chapters:

2.1 Service Design
2.2 Soundscape thinking in city making
2.3 What service design has so far done with regard to sound and soundscapes
2.4 Research Question

2.1 Service Design

Even though many times are perceived as something new, "services have existed since the earliest social aggregations of human beings, and they have always been designed" (Morelli, de Götzen and Simeone, 2021). As a discipline, Polaine et al. suggest that service design can be traced back to the 1920' tradition of industrial design where designers had a common drive to use new industrial technologies in order to improve people's standard of living (Polaine et al., 2013). Probably the introduction of the service blueprint as a tool to design, manage and adjust services by Lynn Shostack in 1982 (Shostack, 1982) has been one of the milestones towards stop thinking about designing products and start focusing on designing services and reflecting upon them as such. On the other hand, while being aware of the use of the term service design earlier on, Sangiorgi and Prendiville introduce service design as a "design field that started as an object of theoretical debate in the 1990s and developed as a practice with the first service design studio opening in London in the early 2000s." (Sangiorgi and Prendiville, 2017) By contrast, facing the challenge of presenting a definition for the term service design, in their book "This is service design doing", Stickdorn et al. decided to introduce the most popular answers of a survey they conducted asking 150 service designers to share and vote their own favorite definitions of the term (Stickdorn et al., 2020). This makes it clear that most service designers, even those with many years of academic and professional experience, have a slightly different understanding of

what the term service design means. In the historical notes on the idea of service design Morelli et al. mentions that the term "emerged when the relevance of services in economic activities became evident and the need to properly organize the activities in a service emerged"(Morelli, de Götzen and Simeone, 2021). At the same time they present service design from a design-for-service perspective, looking at services as "a value creation activity in an open-ended problem exploration involving different actors" (Morelli, de Götzen and Simeone, 2021). This perspective "assembles knowledge domains that derive from different disciplines ranging from economic studies that focus on value creation to design studies that analyze the interaction among actors in a service system and all the way up to studies in the socio-cultural areas, which define the roles, knowledge and cultures that contribute to the shaping of services as a value creation process" (Morelli, de Götzen and Simeone, 2021). This is the service design definition that has been adopted for this thesis.
A noticeable point made by Polaine et al. is that understanding people is at the heart of service design because "services are about interaction between people, and their motivations and behaviors" (Polaine et al., 2013). In order to better understand people, to research, create, prototype and test services, service designer use tools and methods (Stickdorn et al., 2020) (Sanders & Stappers, 2018) (Bjørner, 2015) (Buxton, 2021) (Kimbell, 2017) (Reason et al., 2016) (Miettinen & Koivisto, 2009). Examples of such tools are journey maps (Stickdorn et al., 2020) (Reason et al., 2016) (Miettinen & Koivisto, 2009) (Polaine et al., 2013) and service blueprints (Shostack, 1982) (Patrício et al., 2011) (Polaine et al., n.d.) (Stickdorn et al., 2020). Yet, what is the difference between tools and methods? In service design "Tools represent "what" we use, while methods usually describe "how" we create and work with certain tools" (Stickdorn et al., 2020) For example, the journey map tool can be used as a method for data visualization, synthesis, and analysis of an actor's existing experience (a current-state journey map) or planned experience (a future-state journey map). It is important to notice that "research data is one of the core tools of service design" (Stickdorn et al., 2020) and can be collected with different methods (Bjørner, 2015) (Sanders & Stappers, 2018) (Stickdorn et al., 2020) all presenting its advantages and limitations. Hence, it is important for service designers to be aware of which tools and methods were used to collect data, for example, assumption-based or research-based tools (Stickdorn et al., 2020). What most service design tools and methods have in common is that they are predominantly driven by the sense of sight as Kustral Korper points out (Kustrak Korper et al., 2020).

2.1.1 The value of service design

The core value service design offers is the people's perspective and its context brought to the design process. Polaine et al. expresses it in the following manner: "when we build services based on genuine insights into the people who will use them, we can be confident that we will deliver real value" and "when we measure service

performance in the right way, we can prove that service design results in more effective employment of resources – human, capital and natural”(Polaine et al., 2013). From an organization's perspective service design empowers the people using their services, facilitates cross-silo and cross-organizational work while thriving incremental and/or disruptive innovation (Stickdorn et al., 2020) (Miettinen & Koivisto, 2009). Service design brings this value to organizations by providing a design process with a firm foundation in reality, where projects are built on research and testing rather than opinions; making this practical and pragmatic approach to design inherently holistic (Stickdorn et al., 2020). Probably the most important value of service design is its potentiality to design life-centered services (Owens, 2022) or services for social innovation (Mulgan et al., 2007). Ezio Manzini explains it in the following way: “design has all the potentialities to play a major role in triggering and supporting social change and therefore design for social innovation”(Manzini, 2015). Further on, he clarifies that “is not a new discipline: it is simply one of the ways in which contemporary design is appearing”(Manzini, 2015) and that requires “a new culture, a new way of looking at the world and at what design can do with and for people living in it“ (Manzini, 2015). It could also be simply put as Mulgan et al. does, social innovation “refers to new ideas that work in meeting social goals”(Mulgan et al., 2007).

2.1.2 The role of service designers

The word ‘design’ is often used as a verb (to design) ("DESIGN I meaning in the Cambridge English Dictionary", 2022); along these lines, service design is often described as a process. Driven by a design mindset, this process tries to “find elegant and innovative solutions through iterative cycles of research and development”(Stickdorn et al., 2020). The role of service designers is to facilitate this process across the involved actors as a cross-disciplinary language. In order to do so, service designers use tools – sometimes referred to as boundary objects – and methods (Stickdorn et al., 2020). What allows the service designer to take on this role are her capabilities to address the context, controlling experiential aspects, modeling, vision building, engaging stakeholders, working across different levels of abstraction and building lógical architecture (Morelli, de Götzen and Simeone, 2021). Therefore, service designers have the tools, methods and capabilities to have a role assisting complex design processes, through the facilitation of the different actors involved in an open problem area, like for example, contemplating the soundscapes associated with the places city makers design (Munthe-Kaas & Hoffmann, 2016) (Munthe-Kaas, 2015) (Björgvinsson et al., 2009) (Sanders & Stappers, 2008). In their roles, service designers need to contemplate all contextual aspects, including the way people experience the built environment through all its senses ("Is there a universal hierarchy of human senses?", 2008). At the moment, service design tools and methods are predominantly visual-centric

(Kustrak Korper et al., 2020) in consequence the practice of service design as well is predominantly visual-centric, even though people experience services with all its senses, including the sense of hearing.

2.2 Soundscape thinking in city making

2.2.1 City making

City making is the process of researching, designing and building cities. City makers are the people involved in this process. Traditionally, when we generally think about city makers we tend to think about architects, urban planners, engineers and some of these profession's specializations. The reality today is more complex, there is a more diverse group of people involved in the activity of researching, designing and making the cities we live in. City makers could be, just to cite a few examples, anthropologists, health and communities experts, sociologists, IT developers, cycling experts, sustainable food systems experts, lightning experts, and a variety of designers, including interaction and service systems designers ("People - Gehl", 2022). There is also acousticians making cities ("Homepage | Acoustique & Conseil", 2022).

The activity of city making, even at its smallest scale, involves a numerous amount of actors, from the public sector, the private sector, corporations, and the non-public/non-private sector ("The Circle of Human Concern: Video + Curriculum | Othering & Belonging Institute", 2022), making it a cross-disciplinary process addressing ill-defined problems.

One of the reason why city making is an important activity for people is that there are estimations, for example that presented by Arup – an international organization that provides world wide design services for projects in the built environment and across industries – saying that "around 4bn people, or 54% of the world's population, live in urban areas and that cities and its populations will expand in the upcoming years"("Urbanisation 2.0 - Arup Foresight", 2022). Maybe, even more important is how the activity of making cities is conducted. The United Nations Human Settlements Programme, UN Habitat, whose vision is "a better quality of life for all in an urbanizing world" ("About Us | UN-Habitat", 2022) for example, proposes "The value of sustainable urbanization" ("World Cities Report 2020", 2022).

City making, as most design processes, can have different perspectives from which it is driven. I am aware, for example, of perspectives such as smart cities ("Smart cities", 2022), sustainable cities ("ICLEI Europe •• Who we are", 2022) and at the same time I believe that all design practices should be conducted from a life-centered perspective – meaning that all aspects of life and the environment should be taken into consideration in the design process; similar to the 10 principles of life centered design presented by Johnathyn Owens in his medium article (Owens, 2022). Even within each different perspective towards making cities, one can find different ways to embrace them. This can be seen in the different ways to embrace a people-centered perspective towards city making. There we find, just to name a few

examples, the area based initiatives and their work in bonding, bridging and linking social capital presented by Agger and Jensen (Agger & Jensen, 2015), David Sim's soft cities (Sim, 2019), Jan Gehl's human dimension (Gehl, 2010) and those public life studies from the historical perspective presented by Jan Gehl and Birgitte Svarre in their book "How to study public life"(Gehl & Svarre, 2013). Yet, for this thesis, I will consider city making from a people-centered perspective, in the sense of prioritizing the perceived experience of the people using the city. The reason why I made this choice is because, I believe, it is the best fitted perspective for the main topic of this thesis, soundscapes.

2.2.2 Soundscapes

In the late 60's and early 70's, the research and educational endeavor 'The world soundscape project' was founded by Canadian composer R. Murray Schafer ("WORLD SOUNDSCAPE PROJECT", 2022). The soundscape approach recognizes that when people enter an environment, "they have an immediate effect on the sounds, the soundscape is human-made, and in that sense composed" ("World Soundscape Project | The Canadian Encyclopedia", 2022). This project settled the grounds for the modern field study of soundscape studies. Its focus was on raising awareness about soundscapes, its changing character and establishing the concept and practice of soundscape design as an alternative to noise pollution ("World Soundscape Project | The Canadian Encyclopedia", 2022). Schafer in his book, "The Soundscape", starts by saying that noise pollution is a world problem and that soundscape studies, in one way or another, tries to address the following questions: "what is the relationship between man and the sounds of his environment and what happens when those sounds change?"(Schafer, 1994) He's goal, with the soundscape approach, was to "find solutions for an ecologically balanced soundscape where the relationship between the human community and its sonic environment is in harmony"("World Soundscape Project | The Canadian Encyclopedia", 2022). Schafer in detail: 1. explores the historical evolution of soundscapes from natural to the electronic revolution – primarily from a north western and central european world perspective –, 2. examines the relationship between music theory and soundscapes – for example, analyzing the expansion of the academic orchestras in line with the increase of sound levels in cities over the years or comparing the experience of using headphones with the practice of Nada Yoga –, 3. proposes soundscape vocabulary – such as 'acoustic ecology': the study of the effects of the acoustic environment on the physical responses or behavioral characteristics of creatures living within it.; 'ear cleaning': a systemic program for training the ears to listen more discriminatingly to sounds, particularly those of the environment; or 'Soundmark': a community sound which is unique or possesses qualities which makes it specially regarded or noticed by the people in that community, and 4. introduces tools and methods for the acoustic designer [read soundscape designer] to analyze and design

soundscapes from an acoustic ecology perspective such as the ‘Soundwalk’ – an exploration of a soundscape of a given area using a score as a guide, which consist of a map drawing the listener’s attention to unusual sounds and ambiences to be heard along the way (Schafer, 1994). Schafer was clear when stating that ”if the acoustic designer [read soundscape designer] favors the year, it is only as an antidote to the visual stress of modern times and in anticipation of the ultimate reintegration of all the senses” (Schafer, 1994. Today, after conducting various research projects and publishing many books, it is hard to find any type of soundscape study without referring to Schafer’s or ‘The world soundscape project’ to the same extent.

In recent years, the importance of sound and soundscapes for people living in cities is becoming more evident and relevant around the world. It can be appreciated in the increase of international events related to these topics, for example 2020’s ‘The international year of sound’ a “global initiative to highlight the importance of sound and related sciences and technologies for all in society” ("International Year of Sound", 2022); or the second “Urban Sound Symposium” co-organized by different international university with the topic: impact of urban sound on life in cities, techniques and technologies, design and planning ("Urban Sound Symposium", 2022).

Despites ‘The world soundscape projects’ efforts and the establishment of a soundscape field of study, it is evident that today noise management, reducing noise, and measuring noise SPL – Sound Pressure Level – is the main approach towards the sound environment, if there is any, in cities and the city making practice. These approaches treat sound as a waste product, ‘noise’ ("International Noise Awareness Day", 2022) (Cerwén, 2017) (Kang & Schulte-Fortkamp, 2016) (Schafer, 1994), as it can be appreciated, for example, in the book “The Noise Landscape”(Boucsein et al., 2017) with its spatial exploration of the sound environment of cities close to airports. Another example is the GIS based ‘Danish noise map’ which provides users with the noise levels along the largest roads and railways in the biggest cities of Denmark ("Miljøgis", 2022). Which survey to develop it has been carried out in order to comply with EU noise directives ("Noise - Environment - European Commission", 2022). Following the same trend, ARPA – Agenzia Regionale per la Protezione dell'Ambiente del Piemonte – has developed a plugin call ‘OpeNoise Map’ which is a QGIS plugin “to compute the noise level generated by point source or by road source at fixed receiver points and buildings” ("Openoise Map - QGIS plugin - Developers Italia", 2022) and a mobile-tablet friendly app called ‘OpeNoise’ which is a real-time noise level meter ("OpeNoise Meter - Android and iOS app - Developers Italia", 2022). Taking a step further, the company Geomod developed an acoustic simulation software, also based on a GIS technology, called MithraSIG ("MithraSIG - Acoustic simulation software software for exterior area", 2022). Similarly, the firm Spacemaker offers a software called ‘The spacemaker noise analysis’ which claims to: “1. predicts long term sound levels accurately and consistently, and 2.

consider the impact of these sound levels with respect to their desirability and compliance with local standards" ("Analyzing environmental noise in Spacemaker", 2022). These are just a few examples of the noise management and measuring noise SPL approach towards the sound environment. At the same time, soundscapes can be also found in some podcasts categorized as "the things we don't think about – the unnoticed architecture and design that shapes our world" when referring to sound and health in cities and hospitals ("Sound and Health: Cities - 99% Invisible", 2022) ("Sound and Health: Hospitals - 99% Invisible", 2022).
On the other hand, there are still soundscape researchers, like the ones behind 'The rest is just noise' podcast and its guests ("The Rest Is Just Noise", 2022), further exploring the relationship between sounds, people and cities beyond just measuring SPL. PhD Gunnar Cerwén, for example, is also shifting the understanding of sound as a waste product in his thesis, "Sound in Landscape Architecture: A Soundscape Approach to Noise", where he also suggests soundscape strategies and actions (Cerwén, 2017). Some soundscape researchers, like Marie Koldkjær Højlund et al. are even challenging some of the concepts of the traditional soundscape approach from Schafer. Marie Koldkjær Højlund et al. are proposing the 'untuning of the world' – opposing to Shcafer's 'tuning of the world' (Schafer, 1994) – as an exploration of the role people taking ownership of the sound environment has, calling it the 'sonic citizenship' (Koldkjær Højlund et al., 2021).

Concluding, even though, the International Organization for Standardization (ISO) has a standard definition for the term soundscape, an "acoustic environment as perceived or experienced and/or understood by a person or people, in context" ("Acoustics — Soundscape — Part 1: Definition and conceptual framework", 2022), there is no universal use or agreement between authors of what the term soundscape means. Schafer (Schafer, 1994), Jian Kang et al. (Kang & Schulte-Fortkamp, 2016) and Crewén (Cerwén, 2017) have conducted detailed, multidisciplinary explorations and literature reviews on this topic arriving at a similar conclusion and choosing the soundscape definition that best fitted the context of each study. As well as them, I also acknowledge the other uses of the word soundscape while choosing for the case of this thesis to use the definition that, I believe, provides the best fit for a people-centered service design perspective. "A soundscape is a person's perceptual construct of the acoustic environment of a place. The soundscape has the potential, within that particular context, to evoke responses in the individual and result in outcomes that can be attributed to it" (Kang & Schulte-Fortkamp, 2016).

2.2.3 How do soundscapes impact people's life?

Normally we associate the impact of soundscapes on people's life with the negative impact of certain sounds in certain contexts, which most people will interpret as noise ("International Noise Awareness Day", 2022). An example is the impact the sound of motorise road traffic has in people, which studies conducted by

Mette Sørensen suggest that long-term exposures “increases the risk of cardiovascular disorders”(Sørensen et al., 2011) and other health related disorders (Sørensen et al., 2013) (Sørensen et al., 2012). Soundscapes impact people’s life in a variety of ways, as Antonella Radicchi et al. explores in her works “Sound and the healthy city”(Radicchi et al., 2020). In their article, they present the relationship of sound and health in cities from different angles. At the same time, stresses the importance of moving beyond measuring noise levels by decibels and the importance of focusing on understanding the qualitative nuances of sound and soundscapes. Gunnar Cerwén, for example, conducted studies on the role of soundscapes in nature-based rehabilitation which outcomes proposes that “in order to optimize nature-based rehabilitation, the design of future gardens should include consideration, not only for reduction of noise, but also for measures to enhance appreciated sounds”(Cerwén, 2017) concluding that sound requires further attention in nature-based rehabilitation. Following a similar approach and also recognizing the health benefits of nature soundscapes, there are initiatives to provide people access to natural soundscapes through technology like the one from the BBC called ‘BBC Soundscapes for wellbeing’ ("Soundscapes for wellbeing", 2022) or the ‘Soundscapes’ app ("Soundscapes: Listen to nature", 2022) between many similar others. Anthropologist Shannon Mattern proposed in her article about urban auscultation, stethoscopes as analogies for digital sensors as auscultation tools for listening to the urban soundscape in order to determine the health of cities (Mattern, 2020). It can be said that every day it is possible to find more ‘signals’, as Scott Smith and Madeline Ashby present in “How to future” (Smith & Ashby, 2020), of a growing trend towards the importance of listening to the soundscapes of cities. Another example of these signals is Liselott Stenfeldt and Marie Koldkjær Højlund joint article about “The city at ear level” where they explore, the changes in city soundscapes during and after COVID-19 lockdown, how not everyone agrees on what a good sound environment is and the importance of having tools and method to support a nuanced dialogue in order make cities with healthier soundscapes for all (Stenfeldt & Koldkjær Højlund, 2022). Industrial PhD, Sofie Thorsen, for example, in her article “Soundscapes and the sonic future” emphasize the “lack of awareness of the importance of sound for how we perceive the quality of a place” and “how the built environment curates the soundscape we live in, and how sounds shape the way we orient ourselves in cities” (Thorsen, 2021). Using also as an example the COVID-19 lockdows, where the soundscapes of most cities in the world got disrupted almost overnight and people got to experience these changes in a wide range of ways, she raises the questions “How do we want our cities to sound?” and “how do we design a soundscape to suit everyone?” (Thorsen, 2021). The question is: what is a healthy soundscape? The challenge trying to answer this question is that, there is not universal agreement on what a healthy soundscape is, and primarily this is because soundscapes are a person’s construction of the

sound environment of a place in a specific context. It can be suggested though, that in most cases a healthy soundscape requires to have sound events below 85dbA ("Impact on Hearing - Noise Awareness Day", 2022) and that it will also depend on each person's perceptual construction of the sound environment of that specific place and its particular context. This complexity around soundscapes makes it even more relevant to start contemplating them in city making.

2.2.4 Soundscape thinking

Soundscape thinking is the term Cerwén uses to describe the "situations where the experiential possibilities in the sound environment are considered"(Cerwén, 2017). Elaborating further he mentions that "soundscape thinking is used to emphasize the overall experience of sound, where problems and possibilities are accounted for. Soundscape thinking is also used as a means by which to discuss and understand the role of sound in planning and design situations"(Cerwén, 2017). Soundscape thinking, I would add, is a people-centered design conversation with the sound environment. Design as a reflective conversation with the situation in action as Schön presents it in "The reflective practitioner" (Schön, 2016).

Summarizing his literature review about soundscapes studies and its future, Cerwén concludes that "much of the early academic work pertaining to soundscape in planning and design disciplines was concerned with raising awareness and formulation theories and concepts for understanding sound and sonic experience, but the past few years have been an increased ambition to implement the soundscape discourse in practice"(Cerwén, 2017). An example of Cerwén's conclusion is the work of Jian Kang and Birgitte Schulte-Forkamp et al. in their book "Soundscape and the built environment" (Kang & Schulte-Fortkamp, 2016). This book is based on the four years European Cooperation in Science and Technology (COST) Action Soundscape of European Cities and Landscapes, where COST is the European framework supporting transnational cooperation among researchers, engineers, and scholars across Europe ("Soundscape of European Cities and Landscapes - COST", 2022). Here, in a very practical and technical-based case studies, they present a wide variety of cases where: 1. they explore from sound environments to soundscapes, 2. the relationship between soundscapes, human restoration and quality of life, 3. the soundscape impact on perceptual terms, 4. requisites for soundscape investigations, including technical and people-centered mapping of soundscapes, 5. approaches to urban soundscape management, planning and design, 6. Soundscapes as cultural heritage, and 7. applied soundscape practices. Their approach is valuable for soundscape studies and city making. I appreciate and agree with most of the points raised and proposed. Regardless, for the case of this thesis, I believe, some of them are too technical from a service design perspective. Having said so, I believe that their proposed approach and a service design for soundscape approach could be complementary and beneficial to each other.

Hence, also with the intention of putting the soundscape discourse in practice, with this thesis, I intend to suggest adapted service design tools and methods to facilitate soundscape thinking in order to help get one step closer to soundscape doing – putting in practice the soundscape discourse –.

2.3 What service design has so far done with regard to sound and soundscapes

To my knowledge, at the moment of working on this thesis, I found two papers exploring sound in service design. The first one is the work of Sanz-Segura et al. which focuses on how service design can contribute to sound design as a new approach to developing audible alarms for products in the healthcare environment (Sanz-Segura et al., 2019). This paper concludes stating that “the aim of service design is to provide specific insights, design specifications and recommendations for product sound designers and engineers” (Sanz-Segura et al., 2019). The second paper is the work of Kustrak Koper et al. which presents how the service design practice has been primarily visual-centric, proposes “sound as an alternative representation medium to augment design tools and methods” (Kustrak Korper et al., 2020) and suggest a conceptual framework.

I am aware that there has been done work in other design disciplines in relation to sound in services, like for example the overview of emerging topics, theories, methods, and practices in sonic interactive design by Karmen Franinović and Stefania Serafinfrom in their book “Sonic Interaction Design” which states the importance of sound in people's experience and how designers neglect sound as a medium in design disciplines ("Sonic Interaction Design", 2022). I am also aware of the improved service quality measurement (SQM) model proposed by Rui Li for the assessment and analysis of soundscape quality of urban public open spaces (Li et al., 2020). However, for this thesis, and mainly because of the time limitations of this project, I decided to focus exclusively on service design literature that explores the service design process including sound or soundscapes. In this way, leaving for future research, the exploration of what and how service design can learn from the work other design disciplines have so far done with sound. Service designers can clearly provide value to product sound designers and engineers with insights (Sanz-Segura et al., 2019). On the other hand, I believe service design can provide further value than informing other disciplines at the level of services as an interaction (Morelli, de Götzen and Simeone, 2021). For example, designing services contemplating the soundscapes associated with the service touchpoints, or facilitating soundscape thinking to the involved actors of a project where an open-problem area is embraced by cross-disciplinary and/or cross-organizational projects from a people-centered perspective. Mid while, I hear myself saying ‘yeah!’ to the importance of sound as a representative medium for service designers and to challenging the visual-centrality of the service design practice (Kustrak Korper et al., 2020). I am also aware of how sound as a representation is an under-explored concept in

service design, though it is not in other design disciplines from which service design could potentially learn from. An example is the concept of ‘Soundmark’ from soundscape studies (Schafer, 1994). Another well explored concept of sound as a representation is the ‘leitmotif’ ("leitmotif | music", 2022) originated in academic music and included in almost every medium that involves sound, music and stories ("Leitmotif - TV Tropes", 2022). I do agree, though, when Kustrak Koper et al. introduces the value of integrating sound in service design tools and methods in order to “reveal unobserved patterns, create a more inclusive space and tap into the tacit knowledge of differently abled people” (Kustrak Korper et al., 2020). Which is a part of the value this thesis wants to offer the service design community from a soundscape perspective in the context of city making.

2.4 Research Question (RQ)

How might service design help city makers understand and apply soundscape thinking for the places they are working on?

3. METHODOLOGY

This chapter will begin by introducing the context in which this thesis project has been done and the chosen approach to it. Then it will introduce the methods that were used to explore the academic research question. It would first introduce the methods used in 'Phase one', in order to explore and adapt service design methods for soundscape thinking; and later the methods used in 'Phase two', to test these adapted service design methods for soundscape thinking with city makers and users of the service case.

Methodology sub-chapters:

3.1 Project context
3.2 Project approach
3.3 Phase one: service design methods adapted for soundscape thinking
3.4 Phase two: Workshops
3.5 Ethics

3.1 Project context

The work in this thesis is partly a collaboration with Gehl Architects in order to explore the topic of soundscapes in city making. Gehl Architects, represented by Jeff Risom – CIO and Partner Director –, allowed me to conduct my thesis research and work from the Copenhagen offices where I had access to facilities, resources, experts, and the opportunity to test the tools and methods I developed for this thesis with their current city makers. At the same time I had been assigned a project supervisor, Liselott Stenfeldt – R&D and Cities Team Diretor – who has experience in working with sound in cities. Is important to mention that the previous semester, as part of this masters program, I have conducted my internship at the innovation team (currently R&D team) at Gehl Architects. During that period of time I was mainly involved, as project assistant, in the Urban Belonging Project, where urban planners and humanities scholars work closely together with local community partners in Copenhagen to explore how different people perceive and experience the city as a place of belonging ("The Urban Belonging Project", 2022). At the same time, I was part of an exploratory project where I explored and combined existing data sets with the goal of designing a method to work with air quality, traffic, lived experience and typology data within the Gehl Lens framework. Currently Gehl Architects is also the organization where I work as student assistant, collaborating in innovative, research and development projects within making sustainable, equitable and healthy cities. It is important to consider that these situations could potentially and unintentionally frame or narrow the thesis exploration to Gehl Architects' approach to making cities, something important to consider in further explorations on the topic.

3.2 Project approach

In order to answer the research question I decided to divide the thesis project in two phases, phase one: service design methods adapted for soundscape thinking, and phase two: workshops. Phase one aim was to explore which service design tools and methods would make sense to adapt for soundscape thinking and how to, while Phase two aim was to test the previously adapted service design tools and methods for soundscape thinking with city makers and users of the service case. Figure 1 illustrates an overview of the project phases.

3.3 Phase one: Service design methods adapted for soundscape thinking

The purpose of phase one was to explore which service design tools and methods would make sense to adapt for soundscape thinking and how to. With that aim, I decided to implement an exploratory research approach (Stickdorn et al., 2020) combined with sketchy (Knapp et al., 2016) (Buxton, 2021) loops of ideation, prototyping (Stickdorn et al., 2020) (Savoia, 2019) and convenience sampling (Bjørner, 2015) guerrilla testing (Parry, 2022) with city makers. The exploratory research approach allowed me to learn more about how soundscapes could be contemplated in service design tools and methods without formulating any explicit assumptions (Stickdorn et al., 2020). This research approach combined with sketchy loops of ideation, prototyping and convenience sampling guerrilla testing with city markers provided agility ("Manifesto for Agile Software Development", 2022) to the designerly 'Thinging' (Björgvinsson et al., 2009) process of adapting service design tools and methods for soundscapes thinking.

3.4 Phase two: Workshops

The main purpose of phase two was to test the previously adapted service design tools and methods for soundscape thinking with city makers and users of the service case while still being open for collaboration and co-designing with them. With that aim, I decided to adopt a confirmatory research approach and facilitate two workshops (Stickdorn et al., 2020): workshop one with city makers at Gehl Architects offices in Copenhagen, and workshop two with users of the service case in the field.

Workshops are a key working format for service designers, they are a space for co-designing (Sanders & Stappers, 2008) in collaboration with the different actors involved in a service design project and that is why facilitation is an important skill for service designers (Stickdorn et al., 2020). Workshops allow service designers to engage a diverse group of participants in a multidisciplinary team, encourage a rounded approach to a project, keep the project rooted in reality, and boost the buy-in from a wide group of stakeholders who have been involved from the beginning (Stickdorn et al., 2020). Both workshops have been facilitated in Copenhagen and centered on an assumption-based service case (Stickdorn et al., 2020): the service a stadium facilitates football fans attending a football match. The first workshop was facilitated with city makers

from Gehl Architect at their offices and the second workshop with users, football fans attending a football match at FCK football stadium, Parken. This methodology allowed me to test, collaborate and co-design the adapted service design tools and methods for soundscape thinking with different involved actors from a multidisciplinary team of city makers and the users of the service case, football fans, while keeping the project rooted in what was feasible.

3.4.1 Workshop with city makers

The purpose of this workshop was to test and discuss the service design tools and methods adapted for soundscape thinking by applying them to an assumption-based service case (Stickdorn et al., 2020) in a similar way as generative design research is conducted (Sanders & Stappers, 2018). Some of the questions intended to answer with this workshop where: Do city makers find soundscapes relevant in the design process of making cities? Do city makers understand and are able to use these service design tools and methods adapted to soundscape thinking? Do these tools and methods facilitate soundscape thinking to city makers in an assumption-based hypothetical real case city making project scenario? Can these tools and methods assist city makers and service designers research, design, manage and adjust services contemplating the soundscapes associated with service touchpoints?

3.4.2 Workshop with users in the field

The purpose of this workshop was to test if these adapted service design tools and methods could facilitate soundscape thinking to users in a similar way as a generative design research toolkit will (Sanders & Stappers, 2018). The goal was to learn if people-centered insights about the soundscapes associated with a specific service touchpoint can be explored with users utilizing the same service design tools and methods city makers used in the previous workshop. Some of the questions intended to answer with this workshop were: Do users find the soundscapes relevant in their service experience? Do users understand and are able to use these service design tools and methods adapted for soundscape thinking in order to participate in the city making and service design process? Can these tools and methods be utilized as generative design research toolkits or as participatory design methods in order to assist city makers and service designers research, design, manage and adjust the built environment's soundscapes associated to services touchpoints?

3.5 Ethics

As service system designer I believe that, it is important to keep a reflective in action (Schön, 2016) approach to the ethical aspects involved in the research, design processes and the potential impact the 'Things' (Björgvinsson et al., 2009) we design, co-design (Sanders & Stappers, 2008) or redesign (Munthe-Kaas & Hoffmann, 2016) could potentially have in the actors involved, society, the

environment and, with today's expansion of outer space exploration, the universe. During this masters program, we explored ethics in the service systems design practice in different opportunities, cases and from different perspectives. For example, in participatory governance (Fischer, 2016), agonism approach and co-designing urban places (Munthe-Kaas, 2015), area-based initiatives (Agger & Jensen, 2015), and navigational practices and composionist design (Munthe-Kaas & Hoffmann, 2016) to name a few topics in relation to city making. During the process of this thesis, I tried to be empathetic, respectful, honest and legal with each actor involved, have moments to reflect about how, act ethically at each step of the process, and try to explore, within what was possible in the scope of this thesis, the potential future impact of what I have been designing for. In practice it also meant to follow an ethical approach to personal data, and be inspired by the ethical principles presented by Thomas Bjørner (Bjørner, 2015).

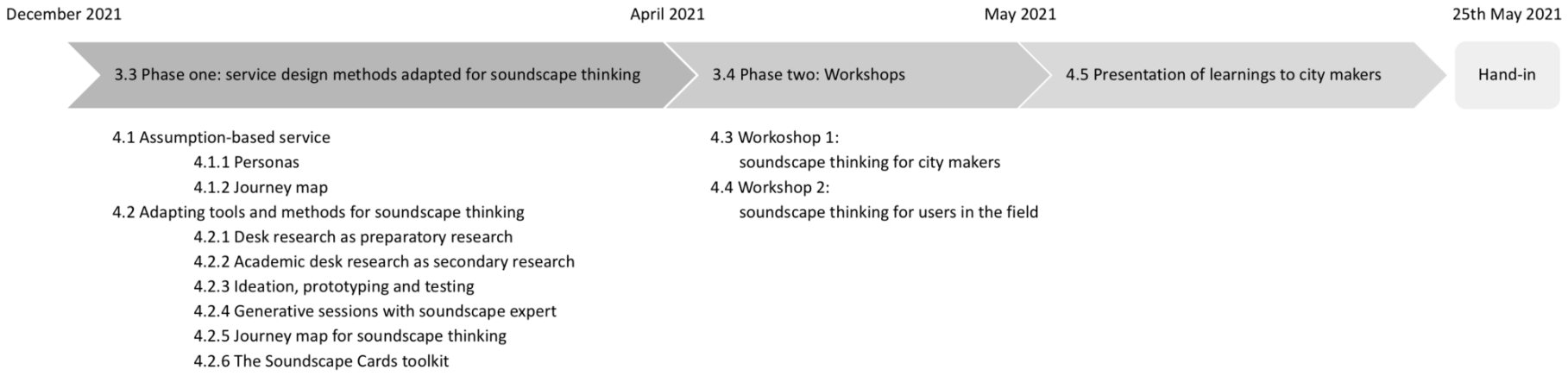


Figure 1: Project overview

4. CASE STUDY

This chapter documents the process of exploring the research question of this thesis. Starts by introducing the designed assumption-based service case which was used to explore the tools and methods adapted for soundscape thinking. Secondly, it will introduce the process of exploring how and the process of adapting service design methods for soundscape thinking. Later, it would move on to present the facilitated workshops with city makers and users of the service case respectively. This chapter concludes with the presentation of the learnings of this work to city makers.

Case study sub-chapters:

4.1 Assumption-based service case
4.2 Adapting tools and methods for soundscape thinking
4.3 Workoshop 1: soundscape thinking for city makers
4.4 Workshop 2: soundscape thinking for users
4.5 Presentation of learnings to city makers

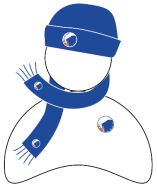
4.1 Assumption-based service case

The service case chosen to explore the research question of this thesis is the co-created value a stadium facilitates football fans attending a football match in Copenhagen. The reason why I chose this service as a case was that this is a service which directly impacts the built environment of cities, its soundscapes and by consequent peoples' experience of cities. At the same time, being football one of the most popular sports in the world, and especially in Europe, it can be assumed that many people relate to or have a basic understanding of this service. Originally, two football stadiums were going to be used as a service case in order to have an opportunity to compare different contexts. The other football stadium was the argentinian football team Club Atletico Boca Juniors stadium 'La Bombonera' ("La Bombonera", 2022). Even though, during the process of adapting the service design tools and methods for soundscape thinking both service cases were being used, at the end one needed to be dropped based on these thesis limitations. During that period, using the two different cases' contexts helped to acquire more perspective on the task. Figure 5 and 6 shows early prototypes with 'La bombonera' as a case.

This thesis, as previously presented, explores how service design methods can assist city makers understand and apply soundscape thinking for the spaces they are working on and its aim is to contribute and expand the understanding of service design and its value in relation to working with soundscapes. Aligned with this aim was my decision to utilize an assumption-based service case (Stickdorn et al., 2020). My intention was to focus the majority of the scarce time for this thesis into exploring which service design tools and methods to adapt for soundscape thinking, how to adapt and test them. Even though service design assumption-based tools are not based on research data, which I believe is not ideal for most service design projects, the quality of the information depends on the creator's knowledge of the subject matter (Stickdorn et al., 2020). In this case, even though personally I have never been a

fanatial football fan, I grew up in a nation that breathes football, Argentina. Born and raised surrounded of fanatical football fans almost my entire life. Additionally, as a design strategist and service systems design consultant, I had the opportunity to work closely to the professional football industry particularly on two occasions. First, consulting for a private security company in Argentina whose operations included professional football matches. Secondly, consulting in Denmark for a UEFA certified football coach with international experience. Over the years, I have also assisted professional football matches in different stadiums and observing different teams, in Argentina and in Denmark, which provides me with some kind of self-enthonograpich insights to the user experience (Bjørner, 2015). Therefore, I believed that for the main objective of this thesis, which is to explore how service design methods can assist city makers understand and apply soundscape thinking for the spaces they are working on, the chosen assumption-based service case is enough. The assumption-based service case is intended to be used as some sort of boundary object (Stickdorn et al., 2020) or generative design research tool (Sanders & Stappers, 2018) in order to focus on exploring the research question. It can also be argued the opposite to be true, though as much as I would have loved to have a research-based service case to explore the research question, the time and context limitations for this thesis project made it almost impossible, or at least to say a big trade off, for the scope of this work.

When working with service design tools is important to be aware of the source of its content (Stickdorn et al., 2020), that is the reason why it has been informed and reminded on different occasions to each actor involved that they were working with an assumption-based service case. Noteworthy as well is that “often assumption-based tools develop into research-based tools over time, as assumptions are challenged and research gaps are identified and closed through iterative research loops”(Stickdorn et al., 2020).



Peter H.

25, Male, Student
In a relationship, No kids, Danish

“When I go to Parken for a FCK match, I loved that it is simple to access and safe by Metro, but I always hope to have an experience like in south american football stadiums, where everyone sings from begening to end, it is a huge party. Perken is too quiet.”

Figure 2: Persona, main service actor

Figure 2 illustrates the persona (Cooper, 2022) (Cooper, 2022) (Pruitt & Grudin, 2003) (Nielsen, 2022) (Madsen & Nielsen, 2009) (Stickdorn et al., 2020) created for the main actor of the assumption-base service case, ‘Peter H.’ a FCK fan ("fck.dk", 2022). Figure 3 illustrates a section of ‘Peter H.’ service journey map. Appendix C illustrates the complete version.

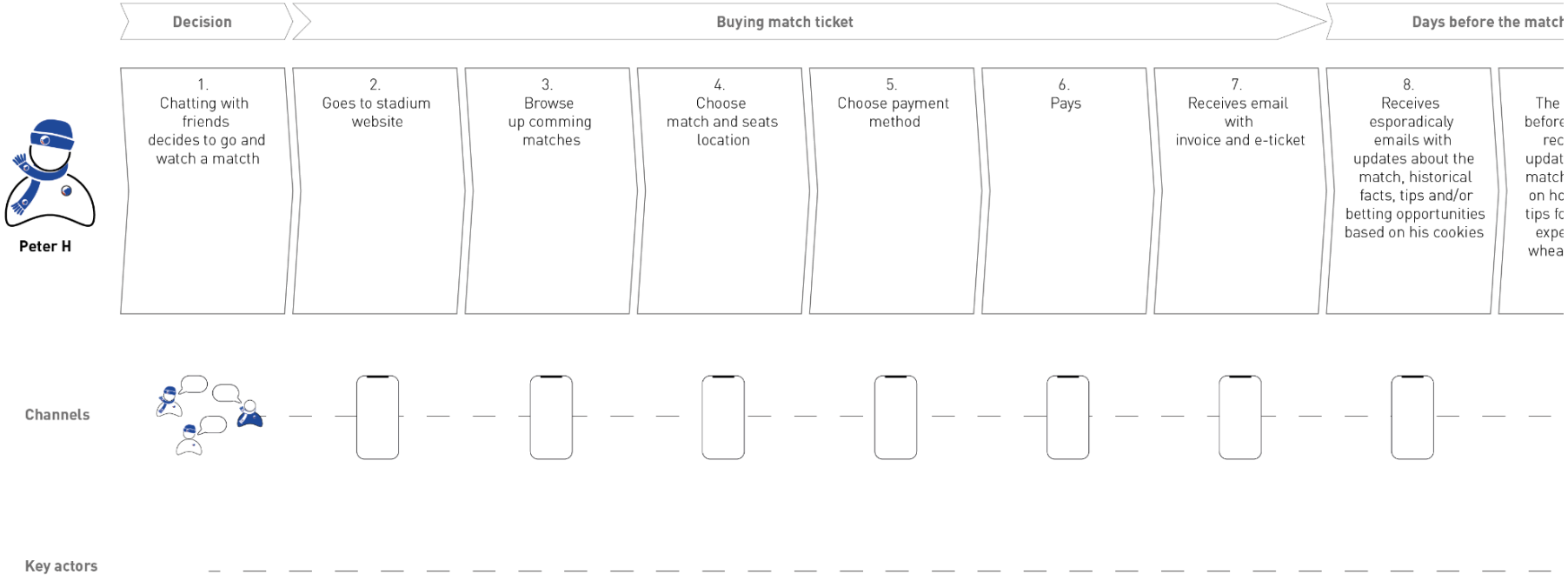


Figure 3: Section from persona’s journey map

4.1.1 Personas

Personas, originally invented by Allan Cooper in the context of interaction design and software development in the 1990's , is today a common service design method to better understand the people, and their context, we are designing services for (Cooper, 2022) (Cooper, 2022). Since Cooper introduced personas to the world, in his book "The inmates are running the asylum"(Cooper, 2022), the method has taken different paths based on the way designers use and adapt it (Nielsen, 2022). Notizable is Cooper's remark on how, he believes, many people misunderstood and mis-used personas. He exemplifies his point of view by comparing how personas were used at his own agency, Cooper, and the way he experienced personas being used at Microsoft (Pruitt & Grudin, 2003). "At Cooper, we did our field research and then synthesized personas as a tool for understanding and communicating the goals, motivations, and desired end-states of our real-world users. At Microsoft, they invented personas to defend the features that the engineers cooked up in their ivory towers. At Cooper, we knew that narrowing the focus was the key to good design, so we tightly restricted the number of personas we used. At Microsoft, they had hundreds of personas, one for each feature they wanted to inflict on their users"(Cooper, 2022). Service design is characterized for being a design practice that empathizes with the actors involved in the process (Stickdorn et al., 2020), and from this point of view I agreed with Cooper's argument presented here. Maybe the most common criticism personas receives is the lack of empiric approach between data and fiction. This criticism can be disproved, explains the first person in writing a Ph.D. about personas, Lene Nielsen ("Author: Lene Nielsen", 2022), because personas is a qualitative method and she argues that critics have misunderstood the beginning of the method. Nielsen also mentions how personas receive criticism for not being able to describe actual people as it only depicts characteristics (Nielsen, 2022). Nielsen, presents four different perspectives on personas: the goal-directed, the role-base, the engaging, and the fiction-based. The goal-directed perspective she associates with Cooper's perspective to personas. The role-based perspective, briefly speaking, builds up on the goal-directed one and also focuses on behaviors. The purpose of the engaging perspective, in her words is "to move from designers seeing the user as a stereotype with whom they are unable to identify and whose life they cannot envision, to designers actively involving themselves in the lives of the personas"(Nielsen, 2022). Lastly, the fiction-based perspective, which goal is to explore design, generate discussions and insights in the field. This last perspective about personas is an assumption-based tool based on the designers' intuition and experience aiming to create an empathetic focus in the design process (Nielsen, 2022).

For this thesis I chose to create fiction-based personas, which aligns with the decision of working with an assumption-based service case, and at the same time creates an empathetic focus towards exploring the service design tools adapted for soundscape thinking while generating discussions and insights in the field. In order to

create the personas for this thesis I borrowed from Stickdorn et al. personas suggested structure: a. Portrait image, b. Name, c. Demographics, d. Quote, e. Mood images, f. Description, and g. Statistics (Stickdorn et al., 2020). With the purpose of keeping the focus on exploring the research question of this thesis, I decided that it was enough for the personas from the service case to only have: a. Portrait image, b. Name, c. Demographics, and d. Quote. In order to better empathize with these simple personas, and being inspired by the work of Madsen and Nielsen (Madsen & Nielsen, 2009) and Quesenbery and Brooks (Quesenbery & Brooks, 2011) about storytelling, I decided to expand the d. Quote section into a brief narrative from the personas perspective. This allowed me to keep the personas simple, to the point, relevant, avoided unnecessary distractions in relation to the validity of this personas and allowed the participants of the workshops to focus on exploring the adapted service design tools and methods for soundscape thinking.

4.1.2 Journey map

Journey maps (Stickdorn et al., 2020) (Polaine et al., 2013) (Miettinen & Koivisto, 2009) (Reason et al., 2016) are a common tool that follows the use of personas in the service design process. Journey maps allow service designers to visualize the experience of the main actor of a service over time. As a people-centered tool, Journey maps reveal all the key steps of an experience, allowing the service designer to identify gaps in people's experience and explore potential solutions. Journey maps can be used to represent current-states or future-states of an actor's journey experience and they can have different 'zoom' levels based on the scope of the project: 30 years, 1 year, 15 days, an hour for example (Stickdorn et al., 2020). Contrary to service blueprints, where all the people and processes involved with the service experience of the main actor are represented, visible or not for the main service actor – 'front stage' and back stage' – (Shostack, 1982) (Patrício et al., 2011) (Polaine et al., n.d.) (Stickdorn et al., 2020), a journey map focuses on the main actor's experience represented by steps, commonly called service touchpoints (Stickdorn et al., 2020). Journey maps basic structure consists of steps and stages defining the scale of the visualization experience, though another way to structure journey maps could be including Mikko Koivisto's concept of service moments (Miettinen & Koivisto, 2009). Koivisto explains service moments in the following way: "Every service is made of episodes or encounters where the production of the service and the interactions between a customer and service provider happen. These episodes, which together constitute the service entity, are called service moments"(Miettinen & Koivisto, 2009). An example of a service moment could be when a football fan arrives at the stadium to attend a match.

Additionally to this basic lane structure of main actors, stages, and steps; journey maps can be enriched with additional lanes. These other lanes could include but are not limited to: storyboards, emotional journey, channels, stakeholders, dramatic arc, what if?.

(Stickdorn et al., 2020) Lastly, journey maps can be experience-centered or product-centered. Experience-centered journey maps visualize the overall experience from the main actor's perspective. On the other hand, product-centered journey maps only focus on the interaction between a customer and a product/service/brand touchpoints (Stickdorn et al., 2020).
For the assumption-based service case of this thesis I decided to use an experience-centered map including the following lanes: stages, steps, channels, and key actors. The last two stages of the persona's journey map have been included in order to contemplate that the service experience will not finish once the football match is over. Though, its touchpoints haven't been included in order to focus on the soundscape relevant part of the actors' service experience journey. Again, the main purpose of this decision was to focus on exploring how to adapt service design tools and methods for soundscape thinking. Journey maps, being a service design tool focused on the experience people have over time, with different touchpoints that can be associated with built environments and that can be enriched with additional lanes, made it a good service design tool to explore how to adapt it for soundscape thinking.

4.2 Adapting tools and methods for soundscape thinking

During phase one, at the very "fuzzy front end" of this project, things were very undefined and, as Lucy Kimbel mentions in her book 'The service Innovation handbook', the decisions made at this stage would impact the future direction of a project (Kimbell, 2017). Acknowledging Kimbel's point, and as a means to be able to pivot and change direction fast during the process of adapting tools and methods for soundscape thinking, I decided that concept exploration and fast prototyping were going to be key for exploring the research question of this thesis. Thus, adopting an action research approach, which one of its core elements is the collaboration between researchers and practitioners in a cyclical process, I believe was the adequate choice given circumstances (Bjørner, 2015). This approach to research allowed me, the researcher, in collaboration with the practitioners, the city makers from Gehl Architects, to go through iterative research cycles. These cycles started by identifying issues, planning research questions to address these issues, acting in order to collect data, analyzing the data to interpret and extract findings, implement and reflect about those learnings and move to the next research cycle. Thomas Bjørner, in his book 'Qualitative Methods for Consumer Research', explains how action research "can be rather complex due to the collaboration between researchers and practitioners, and the cyclical process" (Bjørner, 2015) also elaborates on how there are different suggestions on how this research process works. In the work for this thesis, action research has proven beneficial towards the quick exploration of concepts and prototypes of adapted service design tools and methods for soundscape thinking. The action research approach allowed me to conduct an iterative design process operating from both divergent and convergent thinking and doing, similar to the double diamond framework ("What is the

framework for innovation? Design Council's evolved Double Diamond", 2022), while fast moving from research, ideation, prototyping and implementation stages which are core activities of the service design practice (Stickdorn et al., 2020). On the other hand, this approach can be criticized by introducing excessive agility, like the one proposed by the software agile manifesto ("Manifesto for Agile Software Development", 2022), to an academic research process. This agility can be observed in the development of these adapted service design tools and methods for soundscape thinking where it has been valued individuals and interactions over processes and tools, working tools and methods over comprehensive documentation, collaboration with relevant actors over formalized frameworks, responding to change over following a plan. I am also aware that such an approach doesn't provide statistical validation, which is something this work suggests for future studies.

Phase one was kick started by a desk research as preparatory research, followed by academic desk research as secondary research. Simultaneously, in order to put those research efforts into action, ideation, prototyping and testing of service design tools and methods for soundscape thinking was conducted. At the same time, periodical generative design sessions with a soundscape expert from Gehl Architects were conducted.

4.2.1 Desk research as preparatory research

To kick start phase one, I decided to conduct desk research as preparatory research (Stickdorn et al., 2020) trying to answer the question: What does the internet introduce to me when searching for the following topics: soundscapes, soundscapes in service design, and soundscapes in city-making. In order to try to discover different results in a short period of time, I decided to utilize the following two online search engines: google.com and ecosia.org. I chose google.com because it is one of the biggest online search engines in the world, if not the biggest. Being aware of biases related to algorithms design, like the ones explored by Cathy O'neil in her book "Weapons of math destruction, how big data increases inequality and threatens democracy"(O'Neil, 2016), I decided to complement these searches by also using ecosia.org, a search engine that has a different background. Soon after conducting searches with the same keywords in both search engines, I noticed that, even though many results were the same in both search engines, a reasonable amount of results were not. This proved valuable the use of different search engines, and raised the question: How many different search engines are needed in order to have an objective understanding of a topic when conducting desk research on the internet? In the context of this thesis work, I decided that using google.com and ecosia.org was enough, but if time haven't been a constraint I would have like to use at least two or three more search engines like for example: Bing.com, Yahoo.com, Ask.com, DuckDuckGo.com, or Baidu.com. In

retrospect, I should have also used the incognito tool to navigate the internet in order to try to reduce as much as possible the algorithms biases. In order to broadly systesize the outputs of this desk research as preparatory research, I decided to, while conducting the searchers, bookmark and cluster the different results in folders named by topics as shown in Figure 4. This method was inspired by the synthesis wall method commonly used to debrief research sessions and cluster important insights ("Synthesis Wall | Service Design Tools", 2022). Even though this research method was intentionally conducted at the beginning of the thesis project, further searches have been conducted during the totality of the project, for example inspired by conversations with city makers at Gehl. The relevant results from these further explorative searches had been also clustered with the original ones. Even though I am aware that it could have been a better service design practice, in relation to research practices, to have implemented a research wall I decided not to do so. A research wall would have provided me with an easy overview of the data collected, the mix of research methods and data types, among other benefits (Stickdorn et al., 2020). Yet, having limited space to work in this project, a research wall would direct my focus away from adapting, prototyping and testing service design tools and methods for soundscapes thinking. Therefore, I decided to use the available space to gain similar benefits from the research wall but in relation to the prototypes of the adapted service design method for soundscapes in the context of the assumption-based service case as shown in Figure 5 and 6. This proved to be useful as it worked similar to an open 'Temporary/in-house: The squad' service design place introduced by Stickdorn et al. when they talked about the importance and how to make space for service design in organizations and projects (Stickdorn et al., 2020).

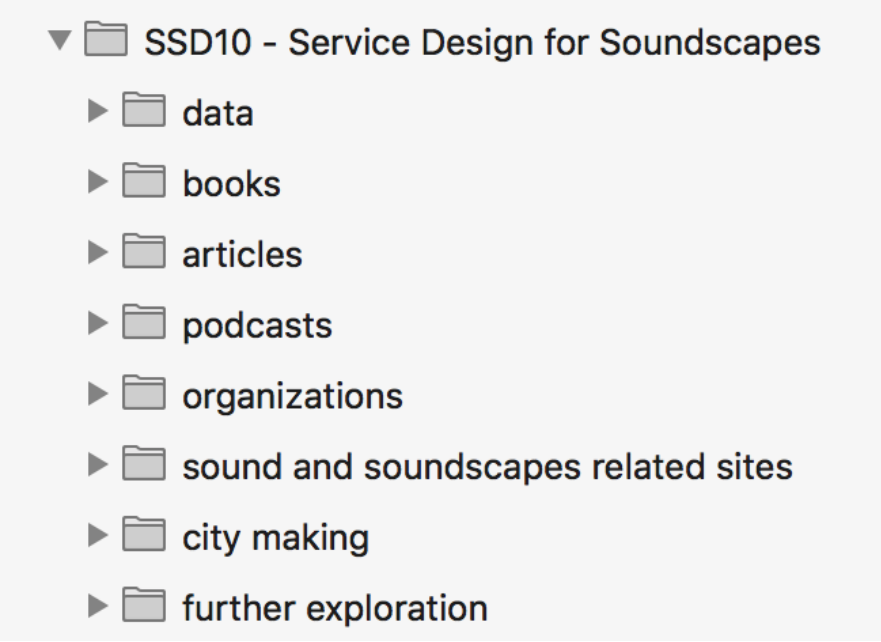


Figure 4: Folders with clustered links from preparatory research

This open 'squad' wall attracted the attention of different passers by city makers and triggered insightful conversations that allowed me to quickly learn and iterate the tools and methods adapted for soundscape thinking.

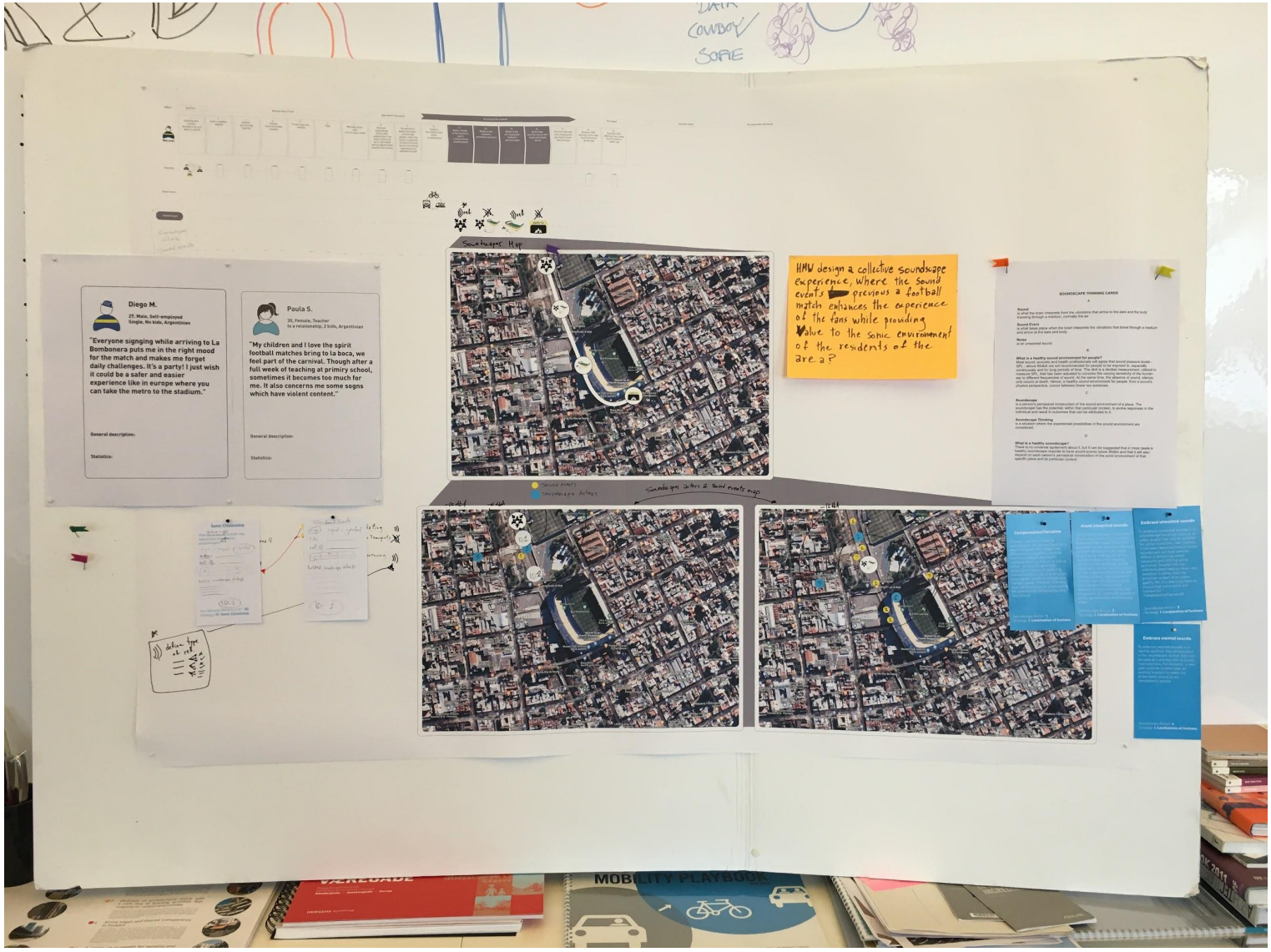


Figure 5: Early prototypes of tools and methods for soundscape thinking

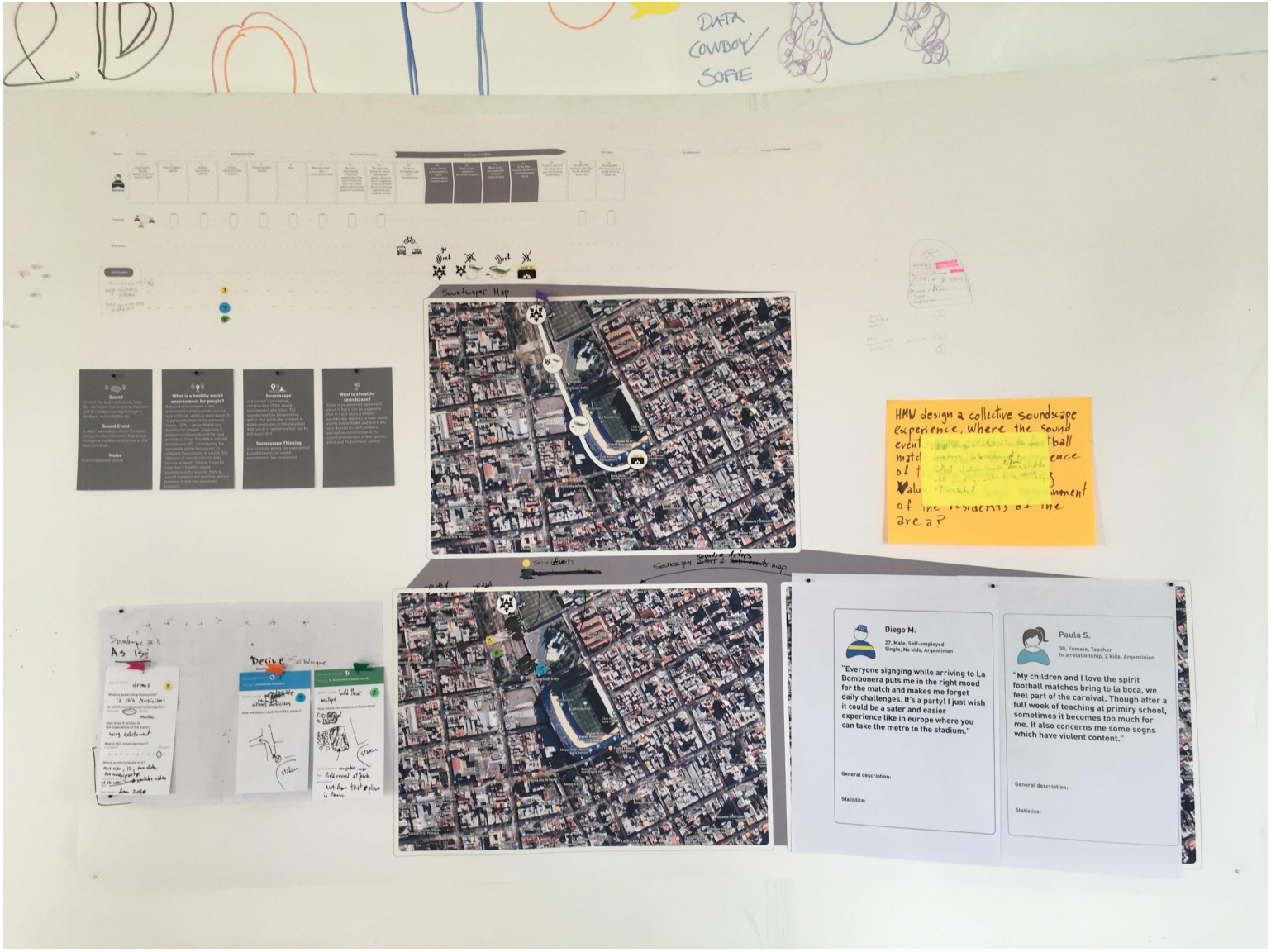


Figure 6: Early prototypes of tools and methods for soundscape thinking

4.2.2 Academic desk research as secondary research

Following the preparatory research, I decided to conduct a secondary research focus on academic work about soundscapes in service design (Stickdorn et al., 2020). The objective was to learn what has been done in relation to working with sound and/or soundscapes within the discipline of service design. In order to do so, I decided to use the online search engine of Aalborg University Library ("The University Library", 2022) and a Google sheet file to log the searches. These searches and logs were conducted in a similar way to how it was explained in the academic search on the university library course of this master program. For practical reasons related to the time limitations of this project, I decided to take into account only the first ten results that appeared on each key word search. This decision did not seem to have interfered with the final results of this research. The keywords used on the different searches were: 'service design', 'sound' and 'soundscape'. For each search, the keyword 'service design' was combined with one of the other keywords 'sound' or 'soundscape' in different combinations as shown in the resulting search log in Figure 7, Appendix D. The search log only tracked those results which actually were related to some extent to working with sound and/or soundscapes in services design. The paper from Kustrak Korper et al. (Kustrak Korper et al., 2020) is not included in the search log because I received access to a copy during its online presentation at SerDes2020 ("ServDes2020 | Hear hear! Why sound in service design should matter", 2022).

It can be argued that the scope of this academic desk research was narrow, and could have included key words such as 'sound in design', 'designing with sound', 'the experience of sound', 'sound as a service', 'experiencing soundscapes', 'mapping soundscapes, 'mapping sounds', 'sketching with sound', 'sketching soundscapes', 'human interaction with sound', 'sound as a journey', 'co-creation with sound', and so forth. It can also be argues that this academic desk research was narrow, because it has been focus primarily on work from the service design discipline and it could have benefited from exploring the work done in other design disciplines like for example, sound design, acoustic design, interaction design, performance design, audiovisual design, behavioral design, physiology, phycology, among others. I do agree with these two arguments, and I believe these further explorations could add value to future studies related to service design for soundscapes. Nevertheless, the time limitations to conduct this thesis project made me decide, in order to use most of the time available to prototype and test adapted service design tools and methods for soundscape thinking, to focus this academic desk research on sound and soundscapes work within the discipline of service design.

	A	B	C	D	E	F	G
1	Date	Key words	Relevant literature (Reviewing only first page of results - first 10 results)	Author/s	Publication year		
2	14 Feb 2022	**soundscape service design**					
3			Soundscape Ecology: Principles, Patterns, Methods and Applications	Farina, Almo	2013		
4			An improved service quality measurement model for soundscape assessment in urban public open spaces	Rui Li1, Dayi Ou1 and Sensen Pan2	2021		
5							
6		**service design soundscape**					
7			SAME AS PREVIOUS				
8							
9		**service design+soundscape**					
10			Design for services and sound aesthetics in the servicescape: influence on the user aesthetics experience	COSTA, Humberto; SANTOS, Aguinaldo dos	2019		
11			Designing Supportive Soundscapes for Nursing Home Residents with Dementia	Paul Devos 1,* , Francesco Aletta 1,2 , Pieter Thomas 1 , Mirko Petrovic 3, Tara Vander Mynsbrugge 4, Dominique Van de Velde 4,5, Patricia De Vriendt 4,5and Dick Botteldooren 1	2019		
12							
13		**soundscape+service design**					
14			ECONOMIC AND LEGAL ASPECTS OF INTRODUCING NOVEL ICT INSTRUMENTS: INTEGRATING SOUND INTO SOCIAL MEDIA MARKETING - FROM AUDIO BRANDING TO SOUNDSCAPING	Alexis DAJ1	2013		
15							
16		**"soundscape"+"service design"**					
17			NOT NEW RELEVANT RESULTS				
18							
19		**"service design"+"soundscape"**					
20			Better Sleep Experience for the Critically Ill: A Comprehensive Strategy for Designing Hospital Soundscapes	Dilip Birdja 1,* and Elif Özcan 1,2,*	2019		
21							
22		**service design sound**					
23			Service Design and Sound: A Chance for Exploration in Oncological Treatment Rooms	R. Sanz-Segura; C. Romero-Piqueras; E. Manchado-Pérez	2019		
24							
25		**service design+sound**					
26			NOT NEW RELEVANT RESULTS				
27							
28		**sound service design**					
29			NOT NEW RELEVANT RESULTS				
30							
31		**sound+service design**					
32			NOT NEW RELEVANT RESULTS				
33							
34		**"soundscape"+"service design"**					
35			NOT NEW RELEVANT RESULTS				
36							
37		**"service design"+"soundscape"**					
38			Better Sleep Experience for the Critically Ill: A Comprehensive Strategy for Designing Hospital Soundscapes	Dilip Birdja 1,* and Elif Özcan 1,2,*	2019		
39							
40		**"service design"+"sound"**					
41			NOT NEW RELEVANT RESULTS				
42							
43		**"sound"+"service design"**					
44			NOT NEW RELEVANT RESULTS				
45							
46							

Figure 7: Aalborg University Online Library search log

4.2.3 Ideation, prototyping and testing

As service designers “learning to let go of ideas to make way for new ones is a crucial skill” (Stickdorn et al., 2020), and it requires practice. With the purpose of learning fast while adapting service design methods for soundscape thinking I decided to ideate, sketch, prototype and test concepts from the beginning of the preparatory research. From a service designer perspective, it was also important for me during the entire process to keep a people-centered mindset, as one of the core values service design provides is empathizing with the people we are designing for and its context (Stickdorn et al., 2020). Hence, inspired by the work of Alverto Savoia in “the right it”(Savoia, 2019) and Bill Buxton in “Sketching user experiences”(Buxton, 2021) I decided to test and iterate daily and quickly early concepts, sketches and prototypes in order to, iteration by iteration, get closer to ‘the right it’ in order to later design ‘it’ right. Starting this process early on the project allowed me to let go of and discard many ideas, ‘the wrong its’, like the ones illustrated in Figure 8 and 9. In this way, also, the desk research inspired the ideation and prototyping process while, simultaneously, testing the prototyped concepts provided feedback to the exploratory research fulfilling the action research approach (Bjørner, 2015). At the same time, it raised awareness and interest between city makers at Gehl Architects on the topics of soundscapes and service systems design for city making, which is an important step towards embedding service design practices into an organization (Stickdorn et al., 2020).

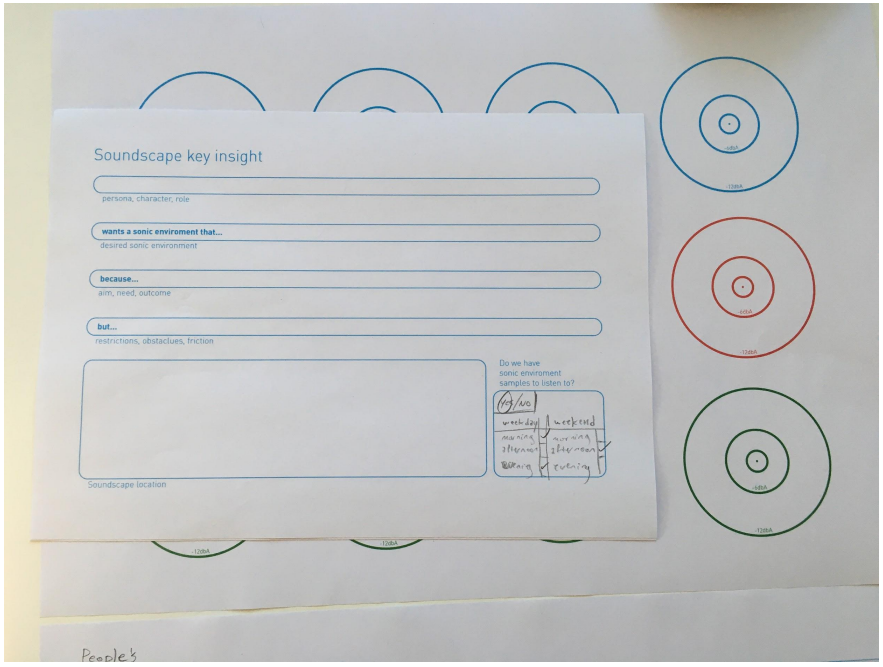


Figure 8: Discarded early prototypes of tools and methods for soundscape thinking

Had engaged in convenience sampling (Bjørner, 2015) guerrilla testing (Parry, 2022) of these early prototypes with city makers from an early stage in the process provided quickly many participants and learnings about these concepts. A criticism this method, similar to the ‘Guerrilla Research’ method popular within UX design (Piyum, 2022), could rise is the risk of over-generalizing

the data and learnings collected since it is based on participants who where present by chance (Bjørner, 2015).

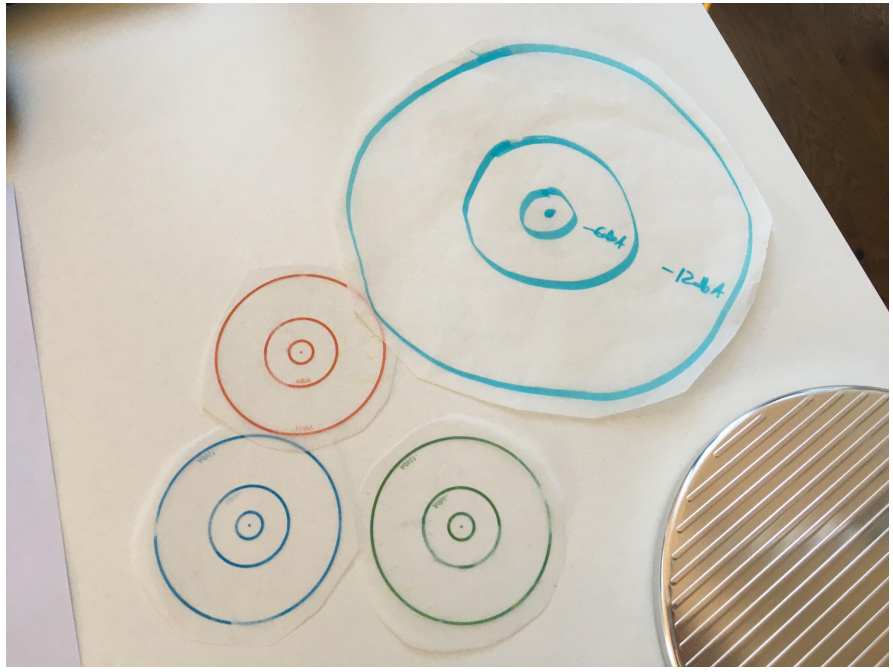


Figure 9: Discarded early prototypes of tools and methods for soundscape thinking

Yet, because these convenience sampling testings were conducted with city makers at Gehl Architects offices, their work environment, it can be argued that the sample of participants was already narrowed, within scope, and randomized. These brief and spontaneous encounters with city makres and the prototyped concepts established conversations between them, me and the concepts, where a reflection in action, as Schön describes it (Schön, 2016), facilitated the iterative process of answering the two following questions: Which service design tool/s and/or methods are more relevant for city makers to adapt for soundscape thinking? And how?

4.2.4 Generative sessions with soundscape expert

As part of the collaboration with Gehl Architects for this thesis project, I had the opportunity to work with soundscape expert Liselott Stenfeldt – R&D and Cities Team Director – as project supervisor at Gehl. Liselott gave me freedom to structure the work as I found it best fit for the exploration of the topic. I suggested conducting periodical generative design sessions (Sanders & Stappers, 2018) with her as an effort to complement the preparatory research, secondary research, ideation, prototyping and testing efforts towards adapting service design tools and methods for soundscape thinking. These generative design sessions had a duration of about 30 to 60 minutes long each and were hosted approximately every 10 days at Gehl Architects offices in Copenhagen during the period between February and May 2022. The framework consisted of a causal and open structure. The aim was to explore how soundscapes can be contemplated in the city making process assisted by service design tools and methods. For that purpose, the prototype concepts for soundscape thinking and the assumption-based case were used as generative research

toolkits – similar to what some authors will refer to as boundary objects(Stickdorn et al., 2020) –. Commonly, these sessions started by me introducing the latest prototyped concepts, visions, challenges and the intended directions to follow. We usually continued with an exploratory and reflective conversation about those topics utilizing the prototyped concepts to further explore and sketch new explorative possibilities.

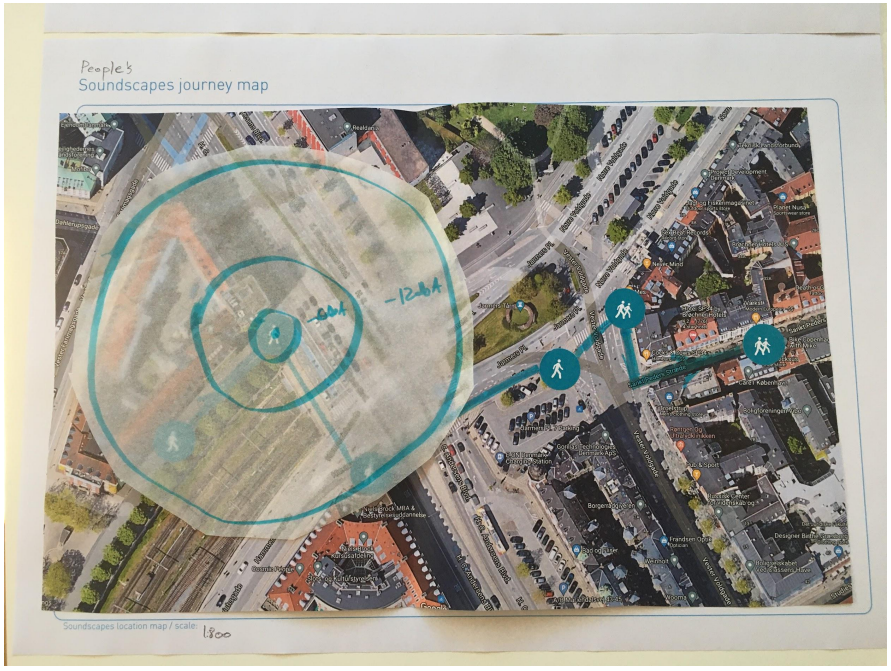


Figure 10: Prototypes of tools and methods for soundscape thinking as generative design toolkit

These sessions allowed me to periodically challenge assumptions, better understand how the process of city making happens, the actors involved, how a city maker in a director role would understand this tools and methods, its potential implementations, different ways to introduce soundscape thinking to city makers, and contemplate different aspects of soundscapes in cities. One aspect to consider in future research from these generative sessions is the possibility for confirmation bias, given that both Liselott and I have in commond a background in sound studies, practice and additionally we work in the same place.

Figure 11: Prototypes of tools and methods for soundscape thinking as generative design toolkit

4.2.5 Journey map for soundscape thinking

Journey maps, in the service design process, "make intangible experiences visible and facilitate a common understanding between team members" (Stickdorn et al., 2020). They are a basic service design tool useful and widely accepted by practitioners for research, design, management and adjustment of services. Journey maps can also "develop into living documents that evolve and change over several workshops and research loops and that bridge different departments and stakeholders in organizations" (Stickdorn et al., 2020) making them a simple tool to incorporate in other disciplines like, for example, city making. Journey maps are the representation of the experience a main actor has over time while soundscapes are the subjective construction of the experience a person has of the sound environment of a place, another reason why journey maps are an adequate service design tool to adapt for soundscape thinking. In order for service design tools and methods to assist city makers to contemplate soundscapes in the places they are working on, I propose adapting for soundscape thinking the service design tool journey maps.

What I propose is to contemplate the soundscapes associated with the service's touchpoints or moments in the journey map by incorporating an additional section for soundscapes, as shown in Figure 12 utilizing the assumption-based service case. Appendix E illustrates a full version in high resolution. The soundscape section of the journey map includes: Lane 1. 'Soundscapes' where it is visually identified, utilizing for example icons, the associated soundscapes of a service touchpoint, Lane 2. 'Soundscape time frame' where the temporal aspects associated to that soundscape are identified, Lane 3. 'Soundscape reference' where audible references associated to that soundscape can be identified, Lane 4. 'Key sound/s & actor/s' where the key sound events from that soundscape and the relevant actors associated with them are identified, Lane 5. 'Key soundscape actions' where the actions required to achieve a desired soundscape for that service touchpoint are visualized, and Lane 6. 'Soundscape journey map' which is a plan of the built environment where the soundscapes associated with the service touchpoint or moments are mapped as an actor's journey.

Lane 1. 'Soundscapes' provides easy identification of the service touchpoints or moments that have an associated soundscape to it. The question that answers to is: which service touchpoints or moments have a soundscape associated to? When soundscapes are identified with an icon it is easier, especially when there are various soundscapes associated with service touchpoints, to relate to them while other tools or methods are used in order to research, design and manage that soundscape, for example the use of The Soundscapes Cards proposed in 4.2.6. On the other hand, some service touchpoints or moments might not have specific soundscapes associated with them. An example could be a touchpoint related to buying a football match ticket online through a mobile phone. In this case the user can experience this touchpoint/s in almost any built environment where it is possible

for her to use a mobile phone with internet access such as at home in bed right before going to sleep, at the office during lunch break, in the metro, among many other possibilities. This raises the questions: wouldn't sound events emitted from the devices associated with a service touchpoint become part of the soundscape experienced by the user at that moment? Can we design that sound experience and hence design the soundscapes associated to that service touchpoint or moment? The answer is yes, to a certain degree we can and we do it mostly unconsciously and poorly contemplating the impact it also has on other people's soundscapes too. An example could be when designing a service touchpoint where a phone application emits a sound as a notification signal. This particular case is outside the scope of the work of this thesis because the focus of this thesis is on the soundscapes associated with service touchpoint or moment connected to a specific built environment. Though these types of cases are also very important to be contemplated while designing service systems. Having said so, this same journey map adapted for soundscape thinking provides the service designers a good starting point to design for those cases too. This is because contemplating the aspects suggested in this journey map adapted for soundscape thinking would inform the service designer which aspects are known and which ones are unknown, facilitating in this way a design decision making process from a soundscape perspective too. For example, being aware of how that sound would impact the experience based on the context and the built environment where the user is at could suggest the use of mobile data like GPS and time in order to change, enable or disable that sound based on what research shows that would improve the service actor experience form a soundscape perspective or not. To summerice, Lane 1. 'Soundscapes' provides easy identification of the service touchpoints or moments that have an associated soundscape to it. Additionally it can also identify soundscapes that would be composed by sound events generated by a service touchpoint, even in cases where those particular soundscapes are unknown. In both cases the Lane 1. 'Soundscapes' provides service designers a tool to research, design, manage and adjust services from a soundscape perspective.

Lane 2. The 'Soundscape time frame' provides a simple identification of the temporal aspects of the soundscape. It answers the following questions: when is this soundscape experienced by the service actor of this journey map? Which days of the week and in between which hours? Soundscapes change over time. They change by the hour or become completely different depending on the day of the week. For example, the soundscape associated with the built environment of a football stadium gate entrance most likely would not be the same soundscape during a regular weekday at ten in the morning compared to the soundscape associated with the same built environment during a football match day five minutes before the game starts.

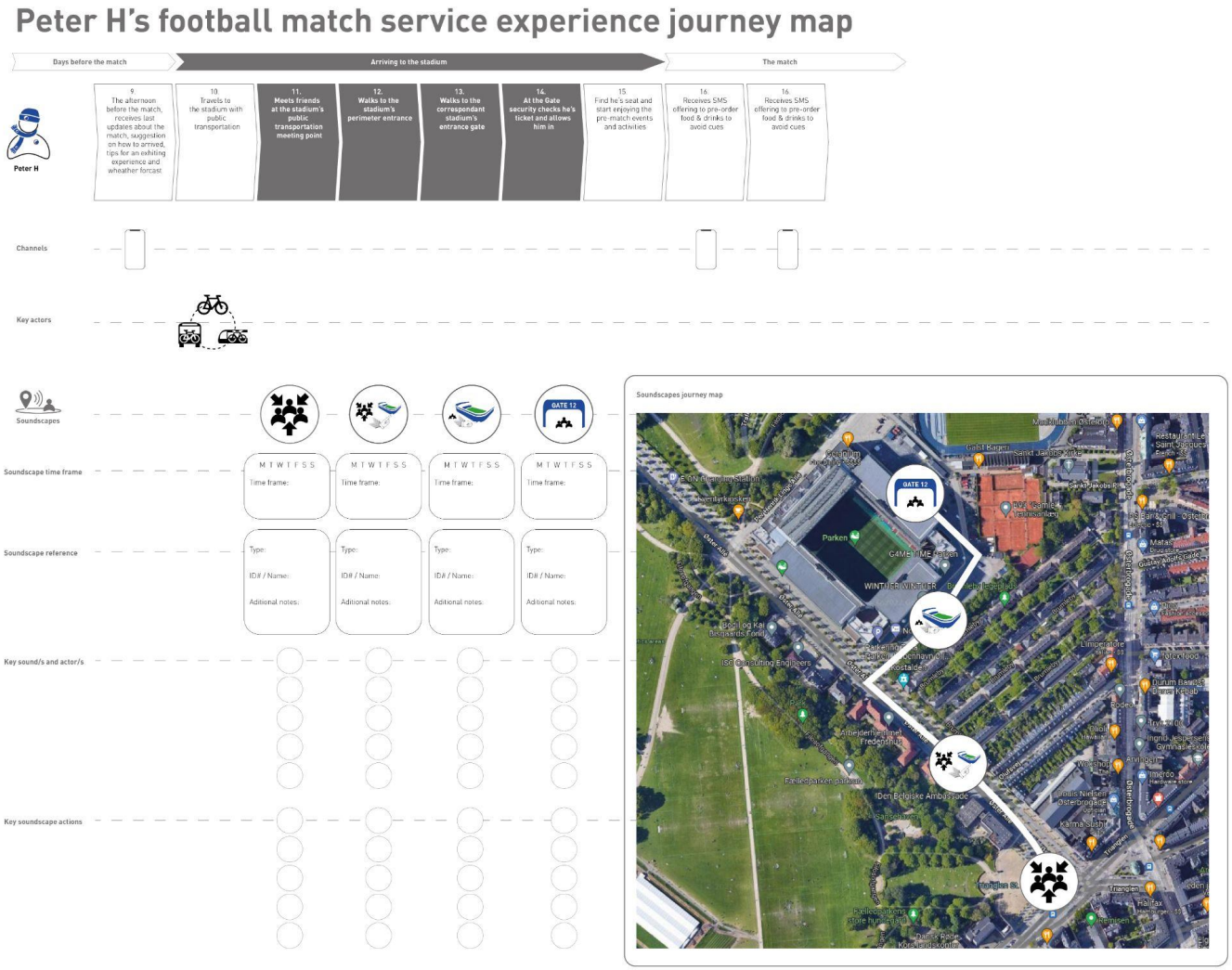


Figure 12: Journey map for soundscape thinking

Time makes a difference on how the sound environment from a specific built environment is, hence how it is experienced by people in those different moments, consequently, how the soundscapes associated to those service touchpoints are or would be experienced depending on time. I would argue that contemplating the 'Soundscape time frame' is, in most cases if not all, crucial in order to research, design, manage and adjust the soundscapes associated with services touchpoints or moments.

Lane 3. 'Soundscape reference' identifies audible references associated with the soundscape associated with service touchpoints or moments. This lane is intended to bring sound to the service designer workplace, in order to start using sound as a medium for designing services. These audible references would help service designers and other actors involved in the process of designing services to better empathize with the actors they are designing for, be better informed and be inspired from a soundscape perspective. This audible perspective is not possible to be obtained by visual representations, with the exception of audiovisuals which by its definition are a combination of audio and visual elements. This lane opens up many new questions like: What is the correct way of registering these soundscape references? What is acceptable as a soundscape reference? How can service designers trust that the way they experience those references at their workplace are the same way service actors experience them during their journey? These and other similar questions are outside the scope of the work for this thesis, though I believe are very important to be explored in future works related to soundscapes in service systems design. What I propose with this lane is that the soundscape references could, for example, be audio files of a recording of the soundscape associated with that service touchpoint, a youtube video from a person in that context that allows one to experience the soundscape, a characteristic sound source from that soundscape, or any other audible element that assist service designers in experiencing or relating to the soundscape associated to a service touchpoint or moment at any level of fidelity at their workplace. What I propose, with this lane, is a first small step towards including sound, as a medium, to research, design, manage and adjust services, besides just recording interviews.

Lane 4. 'Key sound/s & actor/s' identifies the key sound events from the soundscape and the relevant actors associated with them. This lane aims to answer the following questions: Which are the key sound events perceived by the main service actor in this soundscape? And which are the actors associated with those sound events? This lane allows service designers to: 1. identify which are the key sound event/s of a specific soundscape associated to a service touchpoint from the main actor experience's perspective. 2. identify which are the associated actors who facilitate each of those sound events in the soundscape associated to the specific service touchpoint. 1. Identifying the key sound events related to a service touchpoint from an actor's experience perspective allows service designers to better understand which sounds are primarily involved

in the actor's experience, thus informing the potential service research, design, management and/or adjustment needed in relation to designing the desired service experience and value co-creation. 2. Identifying the actors who facilitate each of those sound events informs the service designer which actors would be needed to contemplate at the moment of conducting the previously mentioned necessary service research, design, management and/or adjustment. The information from this lane could potentially be represented in different ways and depending on each particular case it could be argued differently which way is more appropriate. What the research, ideation, prototypes and tests conducted for this thesis have proven to better suit most situations was to associate a 'Sound Card' in Lane 4. 'Key sound/s & actor/s' with a simple sound name and/or code – a number, a color, and/or a letter – also present in that 'Sound Card' as shown in Figure 32. In this way, the visual complexity of the journey map is kept to a minimum while the detailed description of those key sound events and associated actors stays represented on the journey map facilitating the aimed soundscape thinking. These 'Sound Cards' are best to be held close or attached to the journey map. As part of 'The Soundscape Cards toolkit', the 'Sound Card' would be reviewed in detail in the following section of this thesis including the specific information about the sound events and its associated actors included on them.

Lane 5. 'Key soundscape actions' is where the actions required to achieve a desired soundscape for that specific service touchpoint are visualized. This lane answers the question: Which actions can be taken in order to design a more appropriate soundscape for the main actor of the journey map? Similarly to Lane 4. 'Key sound/s & actor/s', what the research, ideation, prototypes and tests conducted for this thesis have proven to better suit most situations was to associate an 'Application of Action Card' in Lane 5. 'Key soundscape actions' with a simple name and/or code – a number, a color, and/or a letter – also present in that 'Application of Action Card' as shown in Figure 32. Again this approach keeps the visual complexity of the journey map to a minimum while the detailed description of those soundscape actions intended to be applied stays represented on the journey map facilitating the aimed soundscape thinking. These 'Application of Action Cards' are best to be held close or attached to the journey map. As part of 'The Soundscape Cards' toolkit, the 'Application of Action Cards' would be reviewed in detail in the following section of this thesis including the specific information about the soundscape actions associated with them and the intended way of applying them in a specific built environment associated with a service touchpoint's soundscape. Lane 5. 'Soundscape Actions' allow the service designer to reflect about the design opportunities and sketch potential service research, design, management and/or adjustment needed in relation to designing the desired service experience and value co-creation from a soundscape thinking perspective.

Lane 6. 'Soundscape journey map' is a plan of the built environment where the soundscapes associated with the service

touchpoint or moments are mapped in a similar way as an actor's journey. This lane informs service designers about the spatial journey between the different soundscapes. This is particularly relevant, because people experience soundscapes also in relation to how they transition from one sound environment to the next one. Making this information important for service designers to contemplate at the moment of researching, designing, managing and/or adjusting the service value proposition from a soundscape perspective.

4.2.6 The Soundscape Cards toolkit

'The Soundscape Cards' toolkit arose from an identified need during the process of research, ideation, prototyping and testing of the adapted service design tools and methods for soundscape thinking. The observations made during that process made a pattern become evident: most people, including service designers and city makers, have different understandings of what sound or soundscapes are. Thus, each person communicates about soundscapes as best as their understanding or vocabulary allows them to. This circumstance generates situations where there is a lack of resources to correctly communicate one's thoughts about soundscapes, generates misunderstandings or in some cases the belief of having an understanding when there is actually not. I believe this situation would have made the use of adapted service design tools and methods for soundscape thinking by service designers and city makers very challenging, confusing or misleading. Based on these observations, it can be said that service designers and city makers, to a certain degree, lack a shared vocabulary about soundscapes. Thus, making it challenging for them to contemplate soundscapes in their design process. Consequently, with the aim to address this vocabulary gap that affects relevant communication in order to use service design tools and methods adapted for soundscape thinking, I decided to design 'The Soundscape Cards' toolkit. The purpose of this toolkit is to facilitate and consider the experiential possibilities in the sound environment of a place from a people-centered perspective. The goal is to understand the current state of a soundscape and sketch actions in order to design a desired soundscape. 'The Soundscape Cards' toolkit is intended to facilitate critical and reflective soundscape thinking in order to design healthier soundscapes for people. This toolking facilitates soundscape thinking in order to have a shared vocabulary about soundscapes between the participants of a project, and in this way supports the use of the journey map for soundscape thinking. 'The Soundscape Cards' additionally facilitates mapping the soundscape associated with a service touchpoint and sketching soundscape actions intended to re-design that soundscape towards a desired one. Is important to mention that 'The Soundscape Cards' toolkit presented in this thesis is a prototype and should be used and understood as such in order to further develope it. 'The Soundscape Cards' toolkit is not intended to be a silver bullet for understanding soundscapes. Rather, it is a prototype for a shared vocabulary in order to start working with soundscape in service design and city making. The intention of this toolkit is to be used by the service systems design and city making community or anyone interested in working with soundscapes so its use will generate the knowledge necessary to further develop it.

'The Soundscape Cards' toolkit consists of four posters, shown in Figures 13 to 16, and two different card types, shown in Figure 17.

Appendix F presents a .pdf file with the ‘The Soundscape Cards’ toolkit current version in full resolution for printing.
Poster 1 introduces the purpose of ‘The Soundscape Cards’, how it is intended to be used, a shared soundscape vocabulary, and an ear cleaning activity (Schafer, 1994) intended also as an “ice-breaker’ activity (Stickdorn et al., 2020). Posters 2, 3 and 4 introduces three soundscape strategies and their corresponding actions based on Gunnar Gewner PhD thesis about soundscapes in landscape architecture (Cerwén, 2017). The two types of soundscape cards are: 1. ‘Sound Cards’ and 2. ‘Application of Action Cards’. The ‘Sound Cards’ facilitates and guides the identification and characteristization of a sound event from a soundscape perspective. The ‘Application of Action Cards’ facilitates the identification of a soundscape strategy and an action, inspired by posters 2 to 4, a reflection about the way it's intended to be applied and provides space to sketch that application.
The intended way to use ‘The Soundscape Cards’ toolkit is: Step a. Identifying a place, time frame and a person, or group of people, associated with the soundscape it would be considered. Step b. Review the suggested soundscape vocabulary from poster 1 – which includes definitions of the word sound, sound event, noise, sound environment, what is a healthy sound environment for people?, soundscape, soundscape thinking and what is a healthy soundscape? Step c. Conduct the ear cleaning activity (Schafer, 1994) also introduced in poster 1. Step d. Map the current state of the identified soundscape utilizing the ‘Sound Cards’ and a plan of the built environment of the place. Step e. Sketch a desired soundscape inspired by Poster 2 to 4 soundscape strategies and actions utilizing the ‘Application of Action Cards’ with a new plan of the built environment of the soundscape.

Step a. allows service designers to identify the soundscape associated with a service touchpoint that is going to be considered and from which actors perspective would be considered.
Step b. helps to establish a shared linguistic resource to correctly communicate thoughts about soundscapes, reducing misunderstandings and/or the belief of having an understanding when there is none between the actors involved.
Step c. the ear cleaning activity (Schafer, 1994), named ‘Let’s start by listening to the soundscape’, facilitates the learning and application of the shared soundscape vocabulary. It does this by applying it to a ‘Sound Card’ while mapping a sound event in the soundscape. Basically ‘Let’s start by listening to the soundscape’ suggests the following three tasks: The First task, ask the person to listen for a minute to the soundscape they are in and during that period of time to identify one sound. The second task, ask the person to use that identified sound to fill in a ‘Sound Card’. The ‘Sound Card Example’ provides that person an example of how a ’Sound Card’ could be filled with the sound of ‘Birds Chirping’. The third and final task, suggests that if it is a group of people using ‘The Soundscape Cards’ toolkit, when all participants are ready, each person can briefly present what was written in their ‘Sound Card’ and indicate the location of that sound in the built environment. If the case is that only one person is using the toolkit by itself, it suggests that person to take a moment to reflect about what was learned from that sound's relationship with the soundscape.
Step d. allows to map the current state of the identified soundscape associated to a service touchpoint utilizing the ‘Sound Cards’, a plan of the built environment of the soundscape, stickers and markers by applying the shared soundscape vocabulary. Each

‘Sound Card’ asks to map a sound event by answering the following questions: What is the name of this sound event?; What is generating this sound?; In which sound category belongs to? – Natural, Human, Other: –; How does it relate to the experience of the place?; How is this sound perceived? – Foreground, Midground or Background, Unpleasant or Pleasant (-5 to 5) –; Involved actor/s? At the same time, each ‘Sound Card’ has a section where it is also possible to identify a sound reference in the same way as in the journey map for soundscape thinking. Each ‘Sound Card’ has, on the top right, an empty circle in order to associate them, when relevant, with the correspondent touchpoints in the journey map for soundscape thinking’s lane named ‘Key sound/s and actor/s’ as shown in Figure 32. The outcome of Step d., which includes all the ‘Sound Cards’ used and the soundscape’s built environment plan with stickers and marker’s drawings and notes, is the ‘Soundscape Map’. Figure 18 shows the ‘Soundscape Map’ co-created by city makers during workshop 1. The ‘Soundscape Map’ is an adaptation for soundscape thinking of the service design tool actors map as a way to facilitate the conversation about the soundscape between the actors involved (Stickdorn et al., 2020) (Giordano et al., 2018) (Morelli & Tollestrup, 2007). ‘The Soundscape Map’ visualizes the sound events part of a soundscape associated with a service touchpoint and its associated actors from the main actor of a journey map perspective.

Step e. allows to sketch a desired soundscape by applying soundscape strategies and actions utilizing the ‘Application of Action Cards’, stickers and markers in a new plan of the built environment of the soundscape associated with a service touchpoint. These soundscape strategies and actions can be inspired by Poster 2 to 4 or can be new soundscapes actions created in the moment. Poster 2 to 4, based on Gunnars PhD work on soundscapes (Cerwén, 2017), are intended as inspiration boards in order to facilitate soundscape thinking and posible soundscape strategies and actions at the moment of sketching a desired soundscape associated with a service touchpoint. In addition to these soundscapes strategies and actions, there is a section, in Poster 1, where it is possible to create new soundscape accions in order to be able to contemplate additional soundscape actions that might emerge during the design process of sketching a soundscape for a service touchpoint. The ‘Application of Action Cards’ are color coded in line with the soundscape strategies posters in order to easily identify the general soundscape strategy applied in a sketch. Poster 2: Strategy I. Localization of functions, blue. Poster 3: Strategy II. Reduction of unwanted sounds, red. Poster 4: Strategy III. Introduction of wanted sounds, green. Each ‘Application of Action Card’ has a place on the top to associate the corresponding soundscape action’s number desired to be applied with that card for easy tracing of the original soundscape action which inspired that application. The ‘Application of Action Card’ answers the questions: How would you name this application of a soundscape action and how would you apply this action in the built environment associated with the soundscape you are sketching? It does it by asking to name the applications, how would you apply this action, and by providing space to sketch or write notes of how the implementation of the soundscape action can take place. In the same way as ‘Sound Cards’, each ‘Application of Action Card’ has, on the top right, an empty circle in order to associate them, when relevant, with the corresponding touchpoints in the journey map for soundscape thinking’s lane named ‘Key Soundscape actions’ as shown in Figure 32.

The outcome of Step e., which includes all the ‘Application of Action Card’ used and the soundscape’s built environment plan with stickers and marker’s drawings and notes, is the ‘Soundscape Sketch’. Figure 19 shows the ‘Soundscape Sketch co-created by city makers during workshop 1. Sketching is a basic, but maybe one of the most important, methods of any design process, this includes service systems design and city making (Buxton, 2021). Therefore being able to sketch soundscapes is also important in order to take the first step towards designing the soundscapes associated with a service touchpoint. The goal of sketching soundscapes with strategies and actions is to establish a first conversation with the soundscape at hand and while making moves, as Schön presents it (Schön, 2016), establish a reflection in action practice with the soundscape associated with a service touchpoint.

These soundscape sketches are not intended to be a final soundscape solution, they are sketches, and as such are intended to explore and communicate the situation at hand in order to better understand it from different perspectives.

‘The Soundscape Cards’ toolkit’s purpose is to facilitate soundscape thinking in order to have a shared vocabulary to map the current state and sketch desired states of the soundscapes associated with service touchpoints from an actor's journey map adapted for soundscape thinking. Can these adapted service design tools and methods for soundscape thinking assist city makers understand and apply soundscape thinking for the places they are working on?

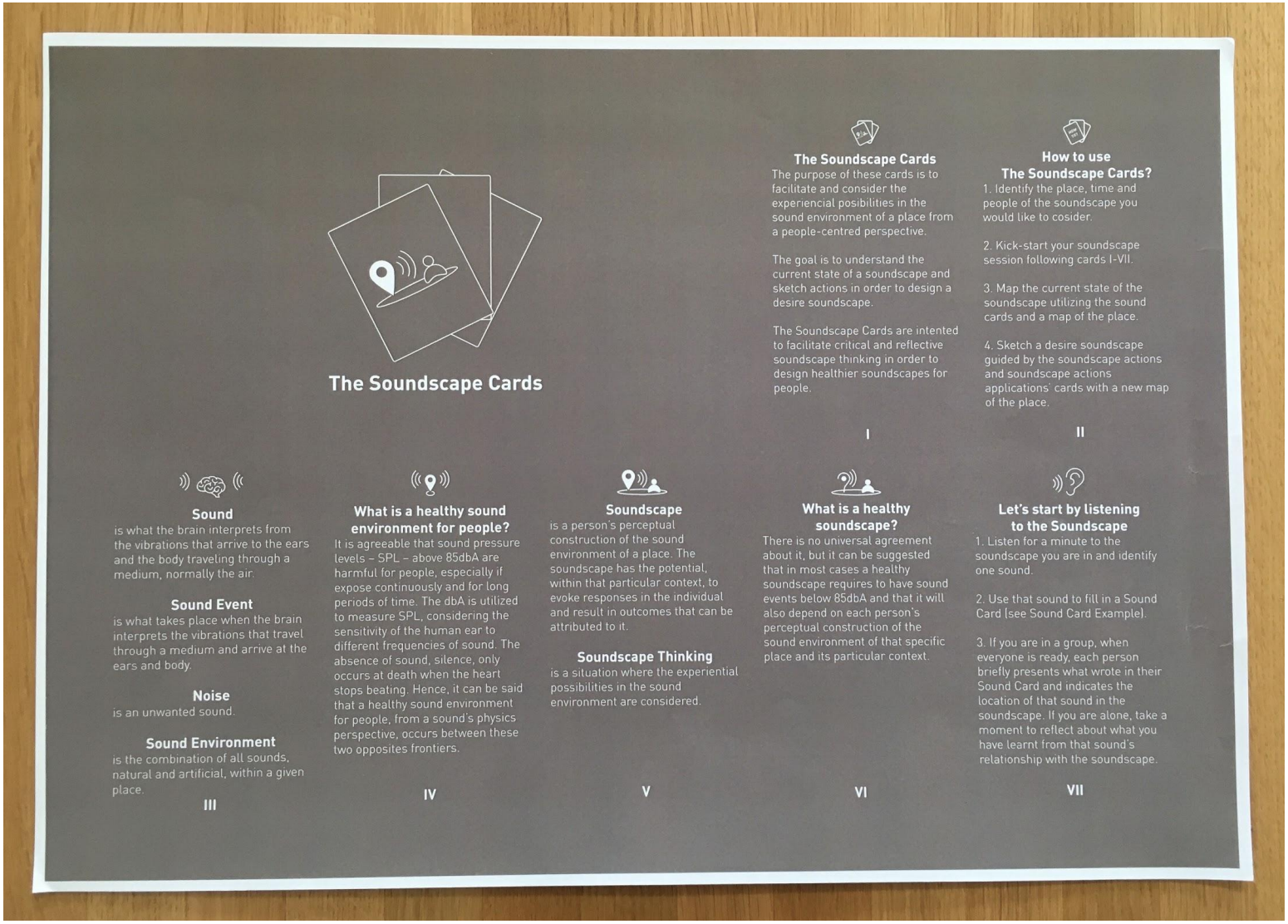


Figure 13: 'The Soundscape Cards' toolkit poster 1

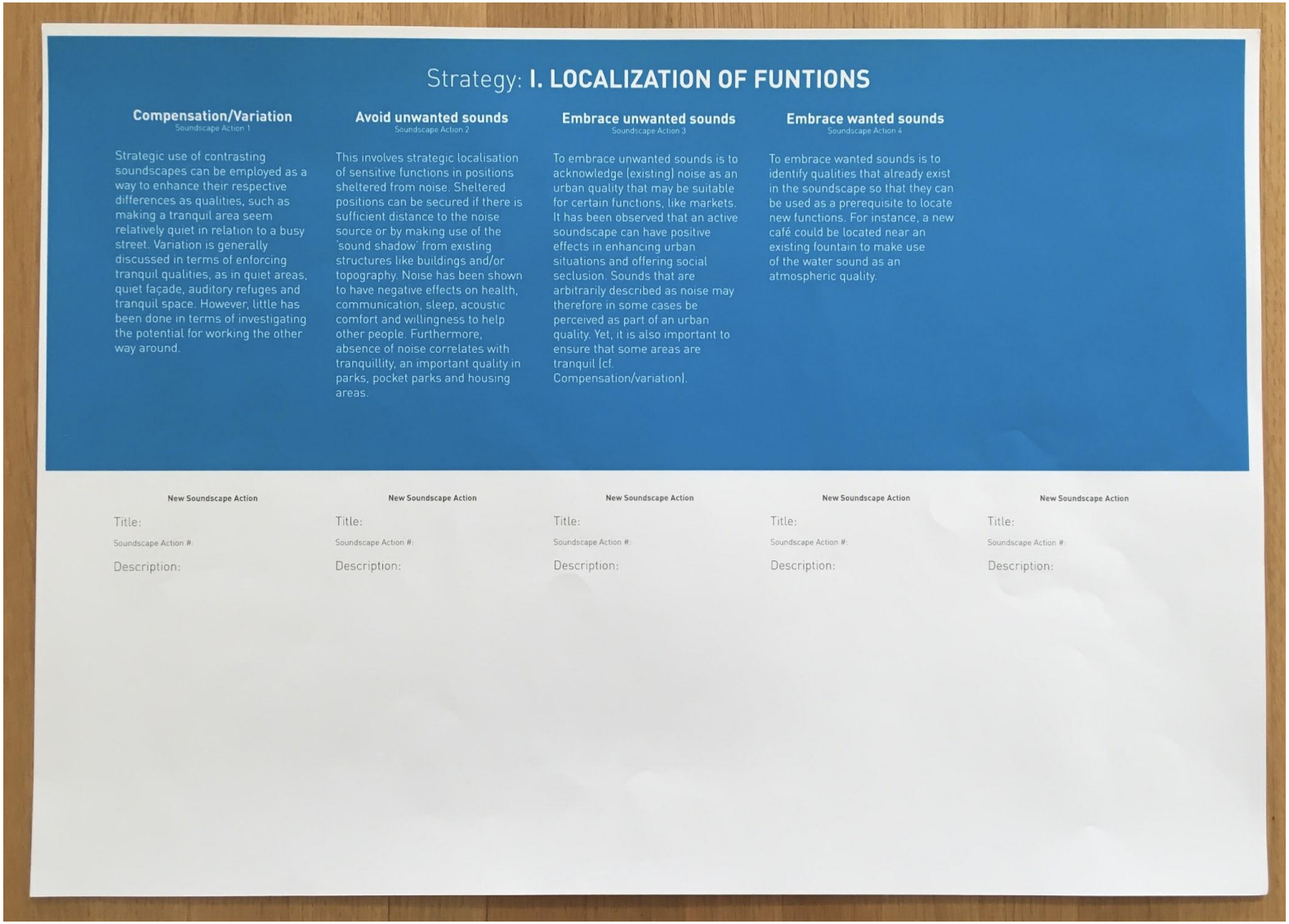


Figure 14: 'The Soundscape Cards' toolkit poster 2

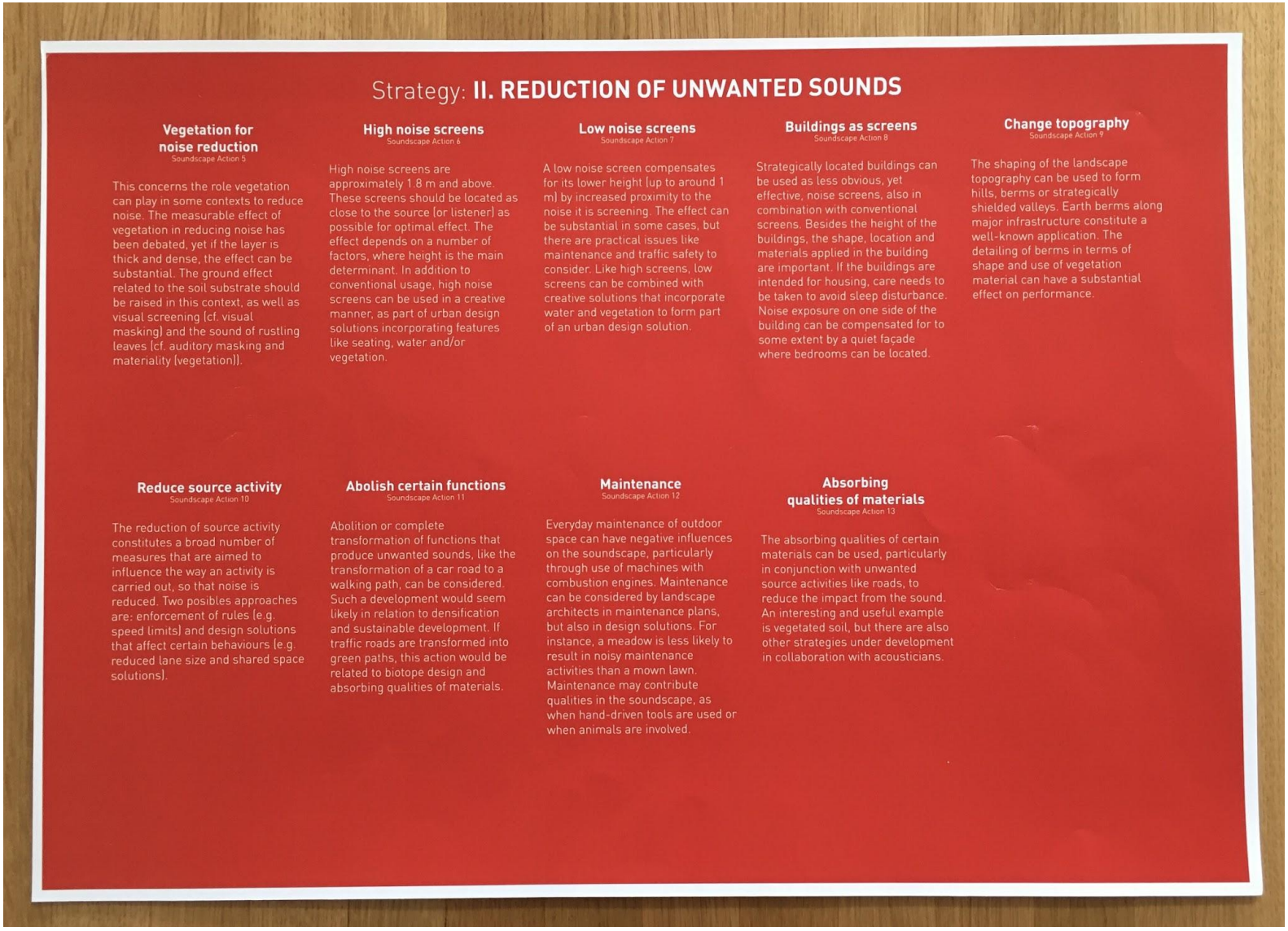


Figure 15: ‘The Soundscape Cards’ toolkit poster 3

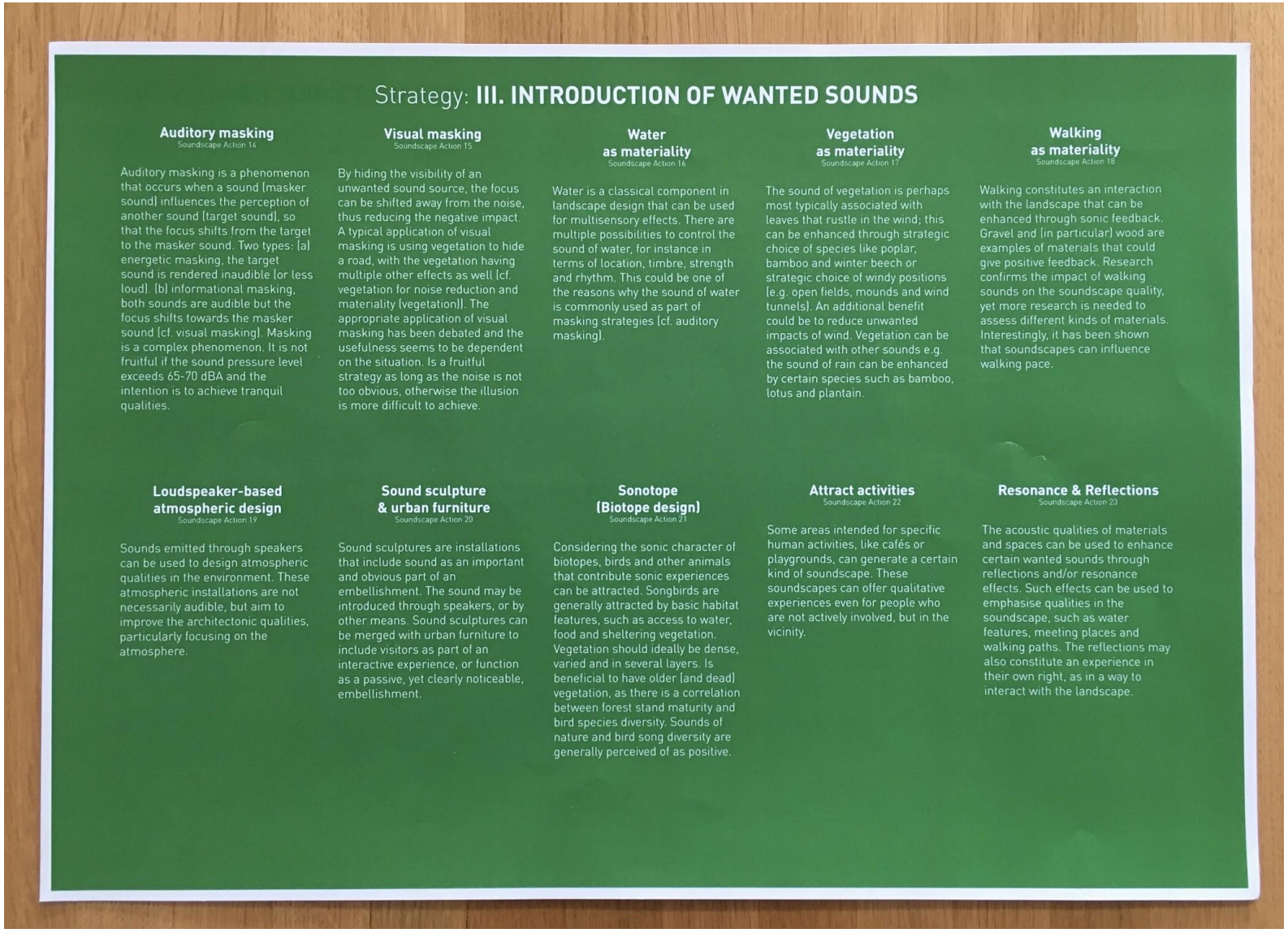


Figure 16: ‘The Soundscape Cards’ toolkit poster 4

Figure 17: ‘The Soundscape Cards’ toolkit cards

Figure 18: A ‘Soundscape Map’ co-created by city makers during workshop 1

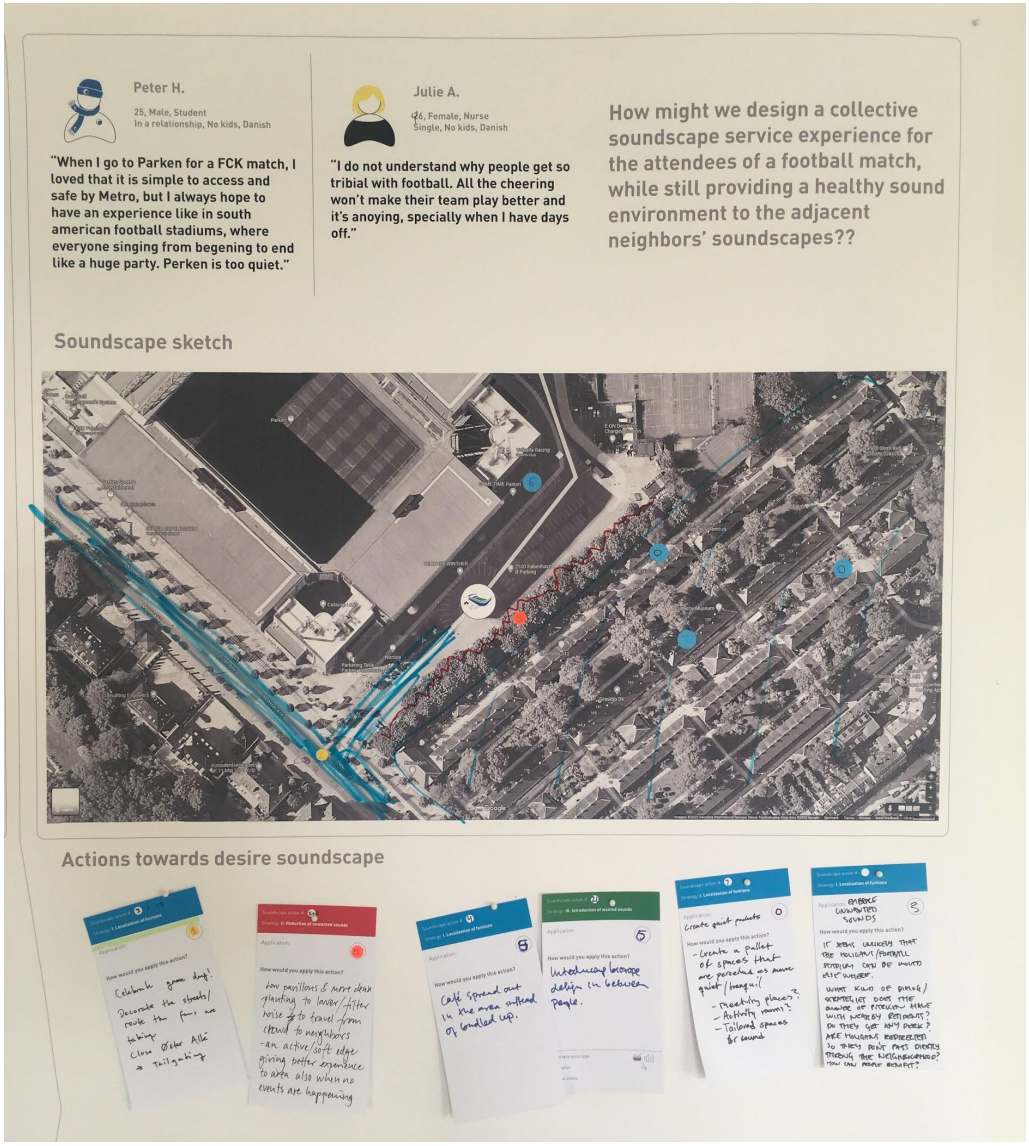


Figure 19: A 'Soundscape Sketch' co-created by city makers during workshop 1

4.3 Workoshop 1: soundscape thinking for city makers

Workshop 1 tried to explore the question: can these adapted service design tools and methods for soundscape thinking assist city makers understand and apply soundscape thinking for the places they are working on?

To answer this question an overt research approach was used (Stickdorn et al., 2020). After a conversation with Gehl's soundscape expert about who would be relevant to have as participants for the workshop, which city makers were available and agreeing on the desired participants, she first introduced the workshop to the chosen participants verbally and later officially invented them over a digital calendar event. This invitation mentioned that the purpose of the workshop was to discuss tools and methods, developed by me, as a way to facilitate soundscape thinking for city makers. It detailed 3 goals: 1. for participants to learn and understand the basics of soundscape thinking, 2. for participants to try to map and understand a place from a soundscape perspective, and 3. for participants to be able to sketch a soundscape utilizing soundscape actions. Additionally, it was mentioned that during the workshop was expected to provide input for this thesis project as a way to initiate a discussion about how Gehl Architects can talk about soundscapes. Five city makers from Gehl Architects Cities team participated in workshop 1: R&D and Cities Team Diretor, another Director from the same team, an Industrial PhD on Service Systems Design, an Interaction Designer and a Technical Designer. Worth mentioning is that both R&D and Cities Team Diretor and the Interaction Designer have previous experience working on research and projects related to sound and cities. Before workshop 1, with the purpose of trying to better understand participants' context and previous experience with city making and soundscapes, I sent them an email asking to answer the following questions: How would you describe your role in making cities? How do you understand soundscapes? And Have you ever worked or participated in a city making project where soundscapes were contemplated? If yes, could you mention which one and how was your experience in relation to working with soundscapes? If not and possible, could you mention a city making project you have worked on that could have benefited from contemplating soundscapes? And Why? Only one participant answered the email, hence this data could not be used for analysis. Previous to the workshop participants demonstrated interest and motivation to be part of the workshop in casual encounters at the office, at the same time city makers are normally very busy making it very difficult to get answers to reflective inquiries like the ones I asked for in this email, especially if they are not related to a client's project. Even though each participant mentioned, during the workshop, the intention to answer the emails later on, non participants did. Initially this survey was planned to take part of the actual workshop, in order to ensure the data was collected and potentially trigger more nuanced insights, yet, because of the time limitations for the workshop I decided to prioritize testing the adapted service design tools and methods for soundscape thinking. Reflecting

afterwards, the survey could have been approached with other strategies too, like for example booking fifthteen to thirty minutes semi-structured interviews (Bjørner, 2015) with each of the participants before workshop 1.

Figure 20: The Soundscape Cards prototype used in workshop 1

This approach could have also been challenging and time demanding for both city makers and me. Deciding at the end, that these aspects of city makers in relation to the adapted tools and methods for soundscape thinking would need to be addressed in future explorations. Workshop 1 was intended to be ninety minutes long, yet the interest on the topic prolonged it to a little longer than two hours. Before starting the workshop, each participant was asked to read and sign consent forms where the outline of the research was explained following Aalborg Universities standards ("Consent from", 2022), see Appendix G.

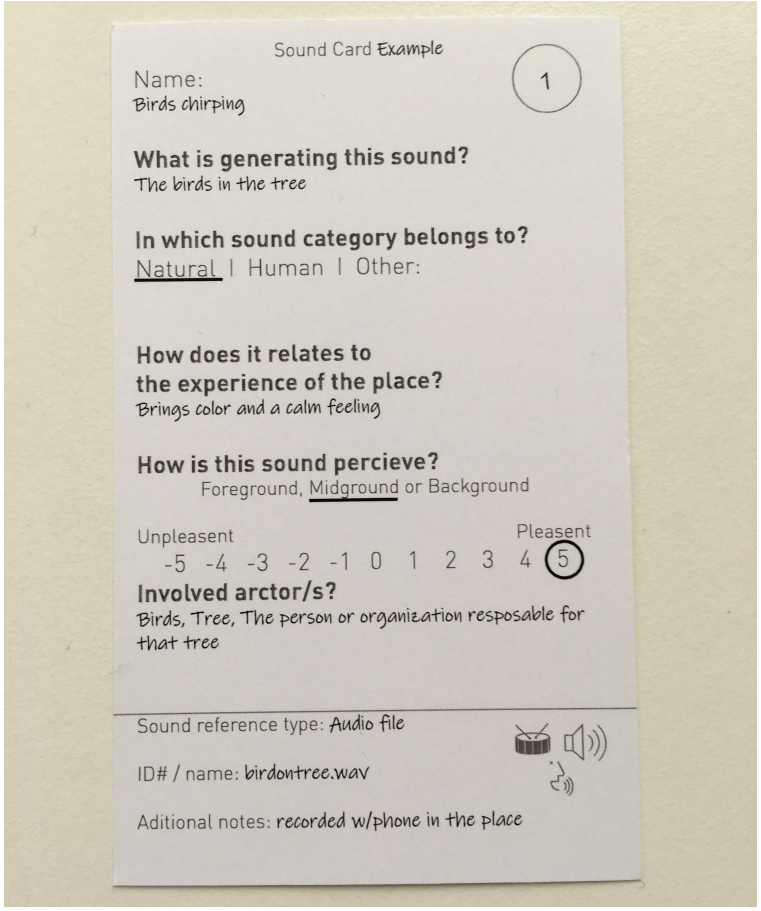


Figure 21: 'Sound Card Example'

After the consent forms were signed, participants were reminded of the purpose and goals of workshop 1. Right after participants were introduced to 'The Soundscape Cards' toolkit and its shared vocabulary. The prototype of 'The Soundscape Cards' used in workshop 1 consisted only of cards, no posters, as it can be appreciated in Figure 20. Following, the 'Let's start by listening to the soundscape' activity was conducted. Participants were able to follow the activity and fill in the 'Sound Cards' without challenges. The 'Sound Card Example' shown in Figure 21 was an important resource for this success. This aspect was a surprise as my hypothesis was that 'Sound Cards' needed further iterations. Two of the resulting 'Sound Cards' from the participants are shown in Figure 22. Participants were able to identify a sound event in their soundscape, describe what was generating it, categorize it, annotate how it relates to the experience of the place, how they perceive it and identify actors involved with that sound event. While sharing each participant the sound event they chose for this activity, the conversations were directly connected to the experiential opportunities these sound events and its actors have in the contemplated built environment. At the same time, participants were adopting the proposed shared soundscape vocabulary from 'The Soundscape Cards'. Having already learnt the soundscape shared vocabulary and applied it during the 'Let's start by listening to the soundscape' activity, participants were ready to map a soundscape associated with a service touchpoint.

At this point, participants were introduced to the assumption-based service case, its main actor's journey map for soundscape thinking – which Figure 12 and Appendix E illustrates – the pre-selected soundscape associated with a service touchpoint that was going to be used and the 'Soundscape Map' canvas of the built environment of that soundscape – shown in Figure 23 and in full resolution in Appendix E –.

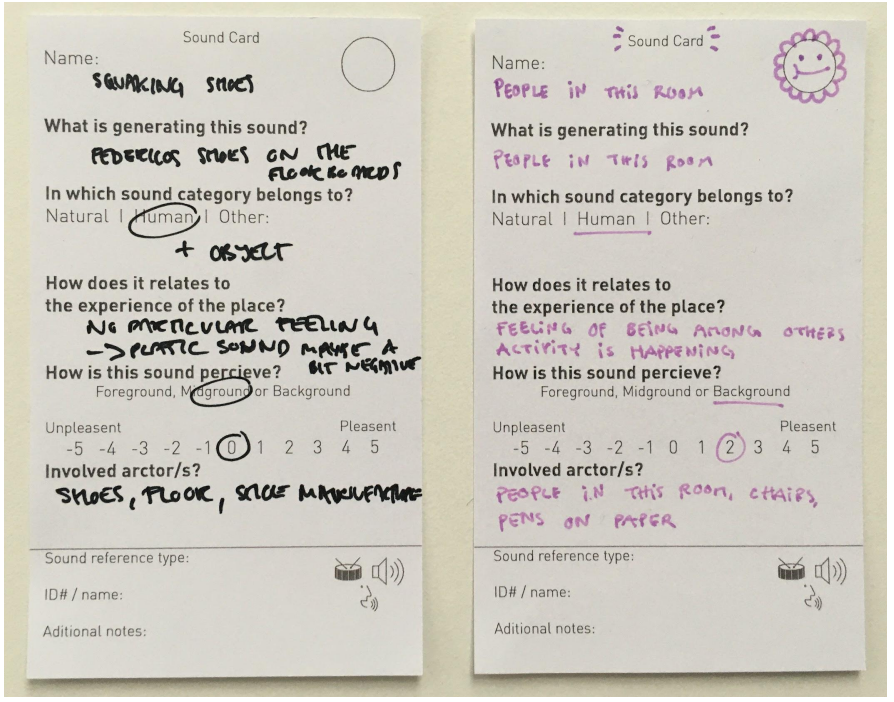
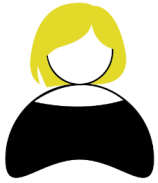


Figure 22: Two city makers 'Let's start by listening to the soundscape' 'Sound Cards' outcomes

A soundscape was intentionally pre-selected before the workshop, in order to direct the focus of the workshop into the use of the adapted tools and methods, rather than the selection of a soundscape to work with. The selection was intended to identify a soundscape associated with a service touchpoint where the built environment presented diversity between the types of built environment: directly associated with the service infrastructure – the football stadium –, private – the neighboring houses –, and public – the bulevar –. The methodology used to select and prioritize a soundscape associated with a service touchpoint, between the different ones a service could have, is a topic for future exploration and outside the scope of this thesis.
At this moment participants were asked to imagine being 'Peter H', the main actor of the assumption-based service case, on its journey at that specific service touchpoint's soundscape. From that perspective participants were asked to map – utilizing their memory and/or imagination, the 'Sound Cards', dot stickers, markers and an individual 'Soundscape Map' canvas – the sound events and its involved actors from that soundscape's current state. Participants were asked to, at least, map one sound event each and were given approximately ten to fifteen minutes to complete this task. Figure 24 and 25 show the moment participants were mapping the soundscape associated with the service touchpoint. Right after participants were asked to transfer the information from their individual 'Soundscape Map' canvas into a group 'Soundscape Map' canvas and place, underneath, the associated 'Sound Cards' as Figure 18 shows. When all participants finished this task, each participant shared the sound/s, its characteristics and the involved actors they had mapped on that soundscape with the group. While presenting, the participants interchanged thought and reflections related to those mapped sound events and its involved actors from the perspective of the service case main actors' experience.



Julie A.

26, Female, Nurse
Single, No kids, Danish

"I do not understand why people get so tribial with football. All the cheering won't make their team play better and it's anoying, specially when I have days off."

Figure 26: Persona, neighbor actor

It was simple to observe and hear that the participants were considering the experiential possibilities in the sound environment of the place associated with the service touchpoint from a people-centered perspective. Another observation from this

moment of workshop 1 is that participants were more aware and intentionally trying to communicate utilizing the suggested shared soundscape vocabulary, something that was helping them have concrete, constructive and focused conversations about the topic and the case from a soundscape perspective.

Now that the soundscape associated with the service touchpoint was mapped, participants were introduced to 'Peter H' persona, the main actor of the service case shown in Figure 2, and to an additional persona called 'Julie A.', a neighbor of the football stadium, shown in Figure 26. Additionally, participants were also introduced to the 'Soundscape Sketch' canvas and to a design brief for the following task: How might we design a collective soundscape service experience for the attendees of a football match, while still providing a healthy sound environment to the adjacent neighbors' soundscape? Shown in Figure 27, Appendix E. Following this design brief participants were asked to individually sketch a desired soundscape for that service touchpoint. In order to sketch the desired soundscape participants were asked to use the soundscape actions inspirational cards, the 'Application of Action Cards', dot stickers, markers and an individual 'Soundscape Sketch' canvas. Participants were given approximately ten to fifteen minutes to complete this task. When participants finished or the time was up, participants were asked to transfer the information from their individual 'Soundscape Sketch' canvas into a group 'Soundscape Sketch' canvas and place, underneath, the associated 'Application of Action Cards' as Figure 19 shows. When all participants finished, each participant shared the sketches each of them proposed to address the design brief with the different soundscape strategies and actions. While presenting, the participants interchanged thought and reflections about the soundscape sketches propoused. For example, conversation about pros and cons of implementing the suggested soundscape strategies and action from different actors perspectives, reflections on how some of these soundscape sketches complement other city making concepts like neighborhood activation and how these points would impact the experience of the involved actors. Again, participants were able to consider the experiential possibilities in the sound environment of the built environment associated with the service touchpoint from a people-centered perspective and even move further sketching strategies and actions in order to re-designing it in relation to a specific brief.

Following this step, about fifteen to twenty minutes were used to discuss the adapted service design tools and methods, 'The Soundscape Cards' toolkit and how Gehl Architects can start talking about soundscapes within its city making practice.

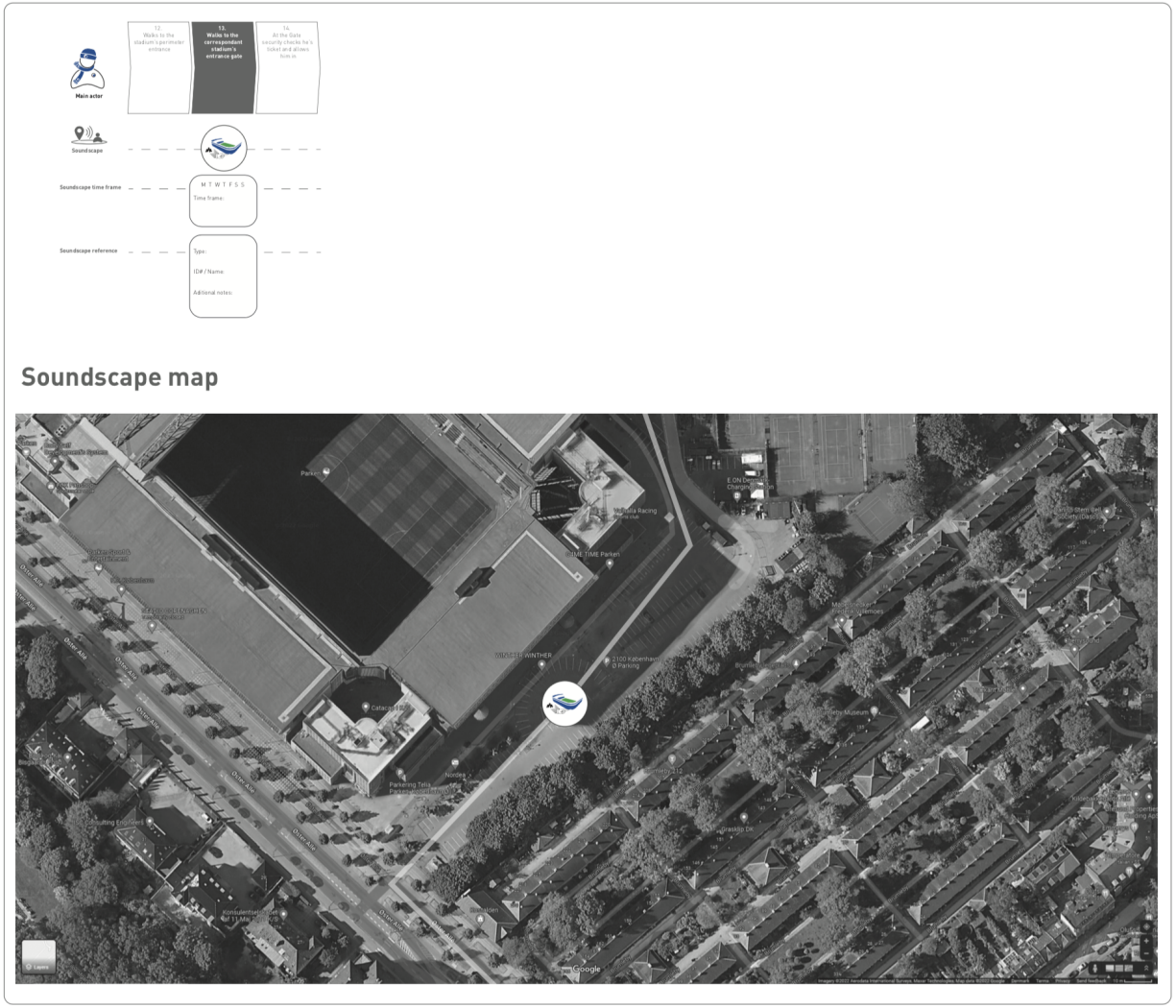


Figure 23: ‘Soundscape Map’ canvas

Figure 24: City makers mapping a soundscape associated to a service touchpoint

Figure 25: City makers mapping a soundscape associated to a service touchpoint

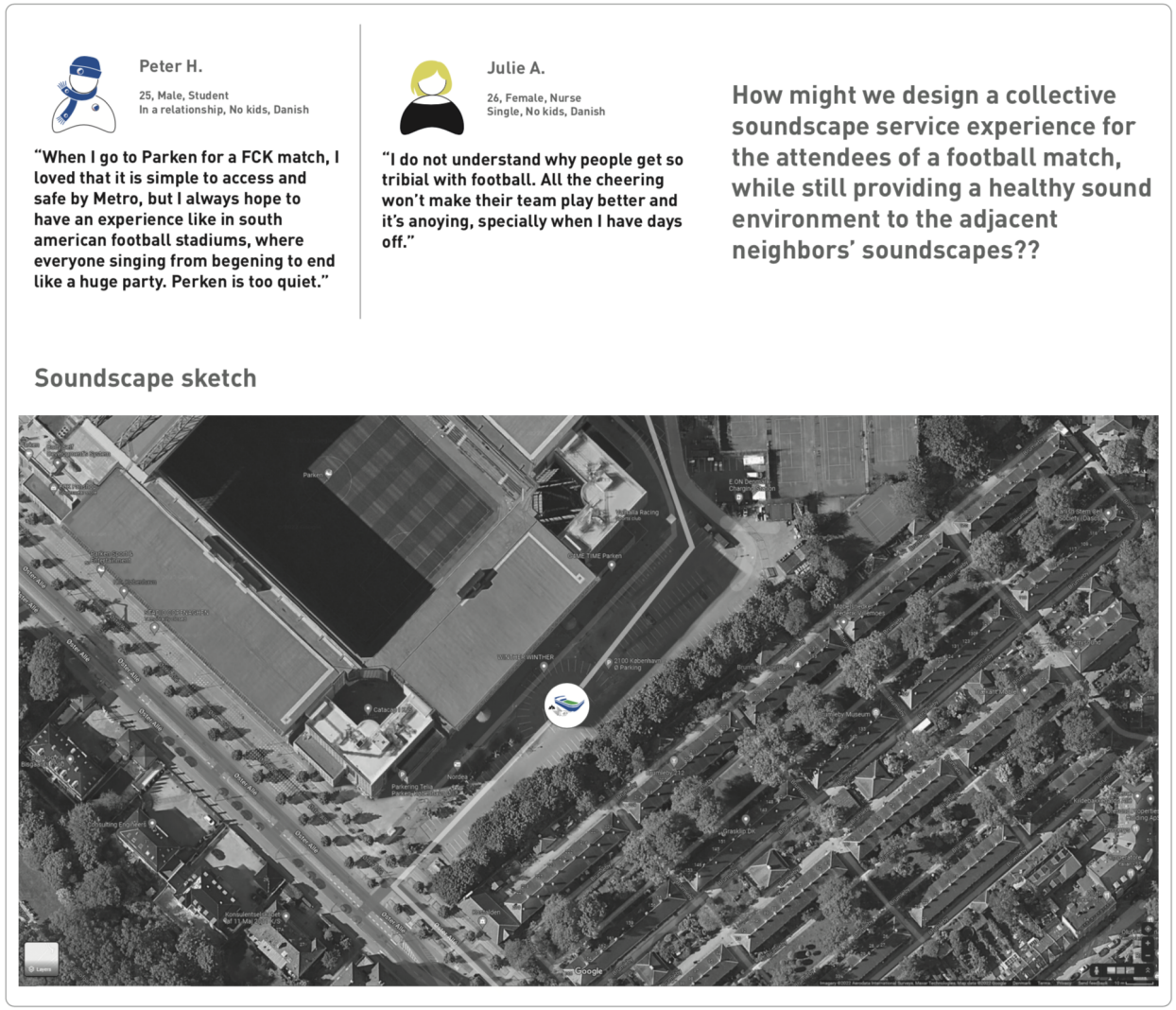


Figure 27: 'Soundscape Sketch' canvas with personas and design brief

Figure 28: City makers sketching a desire soundscape associated to a service touchpoint

Figure 29: City makers sketching a desire soundscape associated to a service touchpoint

Figure 30: City makers sketching a desire soundscape associated to a service touchpoint

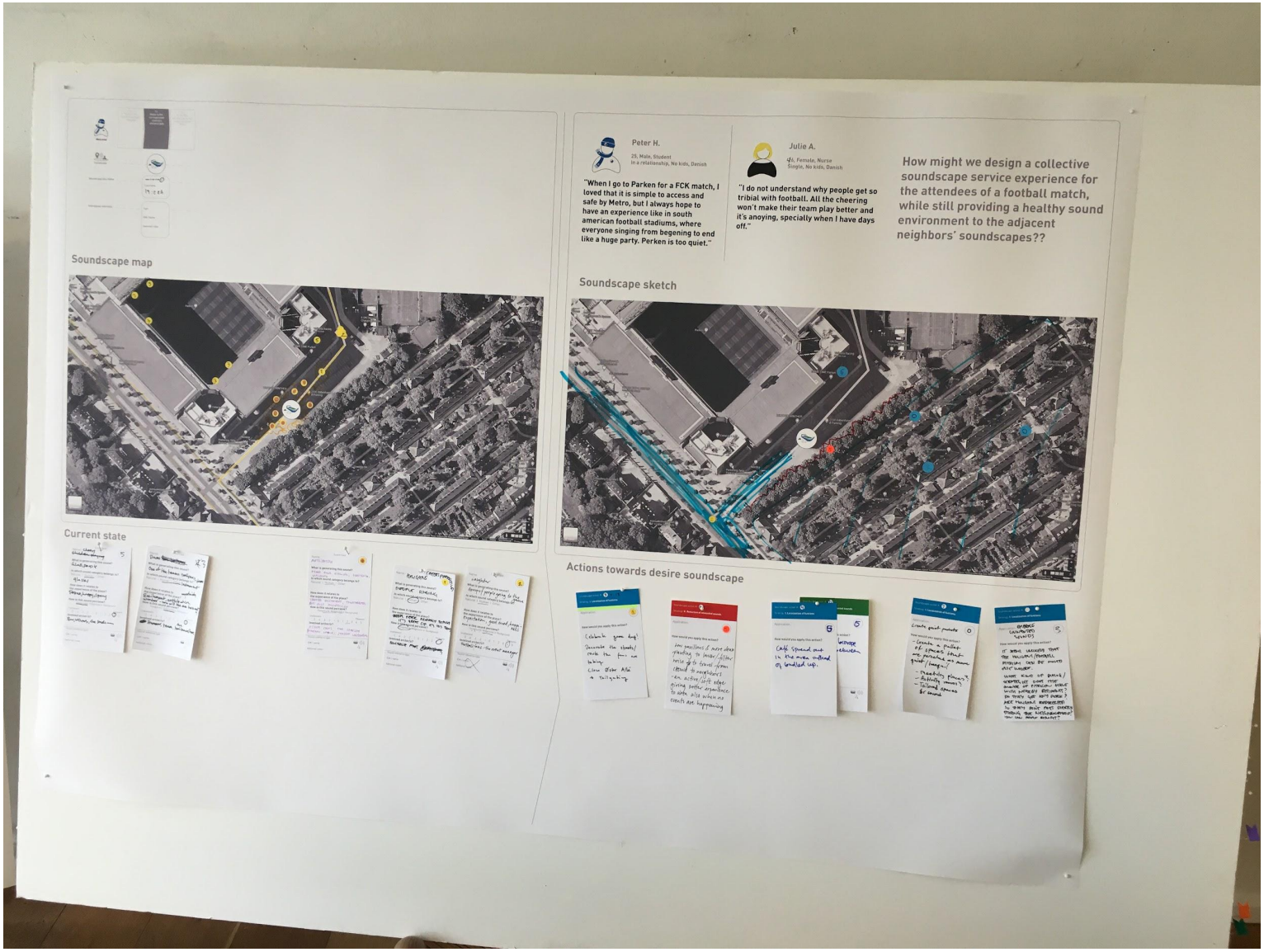


Figure 31: Current state 'Soundscape Map' and desire 'Soundscape Sketch' associated with a service touchpoint by city makers

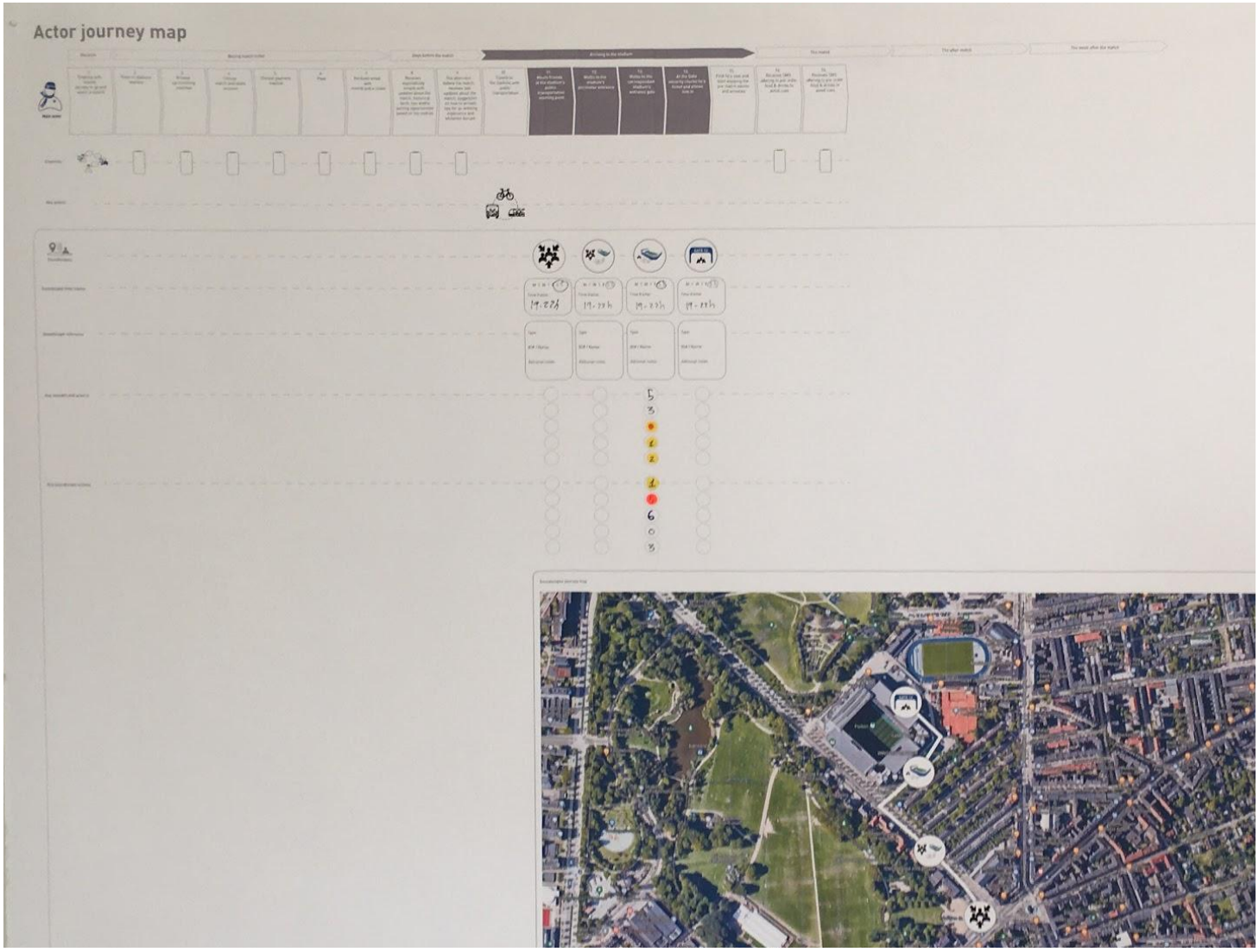


Figure 32: Journey map for soundscape thinking including the codes associated to the ‘Sound Cards’ in Lane 4 and ‘Application of Action Cards’ in Lane 5 from city makers’ workshop

4.3.1 Preliminary reflections on the RQ

The participatory direct observation (Bjørner, 2015) conducted during workshop 1, showed that the 'Journey map for soundscape thinking' allowed participants to consider the experiential possibilities in the sound environment of a place from a people-centered perspective while contemplating its experience journey and context. The 'Journey map for soundscape thinking' showed potential for helping citymaker research, design, manage and adjust the soundscapes associated with the built environment of an actors' experience journey touchpoints. This is, also, a design process that service designers can facilitate in order to help city makers understand and apply soundscape thinking for the places they are working on.

It has been also observed that 'The Soundscape Cards' toolkit was useful to establish a shared soundscape vocabulary and consider the experiential possibilities in the sound environment of a place from a people-centered perspective. Helped city makers understand the current state of a soundscape and sketch actions in order to design a desired soundscape based on two personas and a design brief. The use of 'The Soundscape Cards' facilitated critical and reflective soundscape thinking to the city makers and complemented the use of the journey map for soundscape thinking. Most conversations were focused on the experiential opportunities the mapped sound events and its actors have in the contemplated built environment and participants were adopting the proposed shared soundscape vocabulary from 'The Soundscape Cards' toolkit.

Some opportunities to improve the tools and methods were identified too. For example, during the discussions, participants commented about how it was challenging to have an overview of the shared vocabulary and the soundscape action with the current amount of cards the toolkit prototype had. They also pointed out that it would be convenient that the actual cards of the toolkit were those which are being used to take actions, for example, the 'Sound Cards' and the 'Application of Action' Cards. In order to solve this challenge, participants suggested merging the introductory cards, the shared vocabulary cards, and 'Let's start by listening to the soundscape' card into one poster. They also suggested merging all the soundscape actions from one soundscape strategy into one poster. Incorporating these learnings from workshop 1 participants co-designed the resulting new iteration of 'The Soundscape Cards' toolkit consisting of four posters, shown in Figures 13 to 16, and two different card types, shown in Figure 17.

Another reflection from workshop 1 participants was the idea of including a visualization for each soundscape action, – an icon, photo, sketch, etc.– in order to better communicate the soundscape action and easily inspire participants how potentially that soundscape action could be materialized. Figure 33 illustrates a sketch of how potentially this reflection could be implemented. Even though I believe this is a reflection worth exploring in future iterations of 'The Soundscape Cards' toolkit, I decided to use the time required to design and implement it for other activities, like for example hosting workshop 2 with users in the field.

Finally, in relation to Lane 2. ‘Soundscape time frame’ from the ‘Journey map for soundscape thinking’, which provides a simple identification of the temporal aspects of the soundscape associated with a service touchpoint, answering to the following questions: when does this soundscape happen? Which days of the week and between which hours? Participants mentioned the interest of adding the possibility to identify the time of the year. In previous interaditon of this service design tool, I contemplated this option, to later remove it believing it was making it too complex, now I believe it needs to be included representing the months of the years as: J F M A M J J A S O N D.

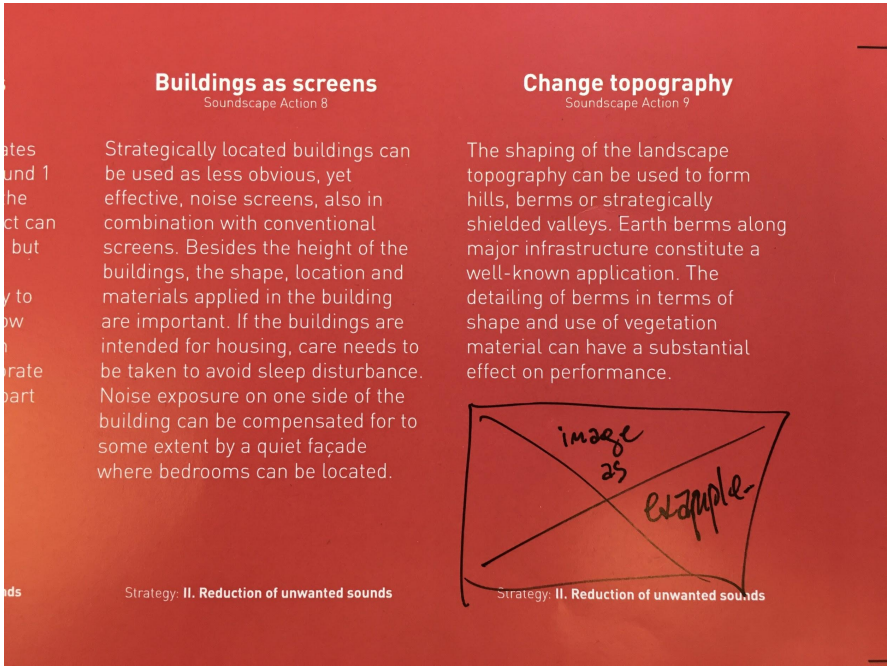


Figure 33: Sketch for further development of posters

4.4 Workshop 2: soundscape thinking for users in the field

While Workshop 1 explored the question: can these adapted service design tools and methods for soundscape thinking assist city makers understand and apply soundscape thinking for the places they are working on? Worksop 2 focus was to explore the two following questions: can these same adapted service design tools and methods facilitate soundscape thinking to users in order to learn people-centered nuanced insight about the soundscapes of the built environment associated with specific service touchpoints? Can this people-centered insight inform the service 'Journey map for soundscape thinking', the 'Soundscape map' and 'Soundscape Sketch' made by city makers in workshop 1?

In the same way as in Workshop 1, to answer this question an overt research approach was also used in workshop 2 (Stickdorn et al., 2020). In order to organize workshop 2, I bought 4 tickets for a football match in Parken Stadium and recruited 3 football fans interested in participating in the workshop. Workshop 2 participants were recruited following a convenient sampling method (Bjørner, 2015). Nevertheless, there were three criterias I followed, participants must: 1. support a football team 2. have attended previous football matches in a stadium. 3. have diverse personal backgrounds between each other. The intention with these three criterias was that participants: 1. and 2. feet as close as possible to the profile of the main actor of the assumption-based service case. 3. provided as diverse perspectives to the workshop as possible within the target group.

Three participants were recruited, one self-identifying as female from Manchester, UK; and two as male from Denmark, one originally from Aarhus and one originally from the Copenhagen region. Over phone conversations participants were brief about the purpose and goal of workshop 2. The purpose being, a. testing the tools and methods I developed, as a way to facilitate soundscape thinking for users of a service in order to learn people-centered insights about the soundscapes related to a specific service touchpoint and b. Initiate a discussion about how these tools and methods can assist users participate in the design process of soundscapes associated with a specific service touchpoint. The goals were 1. for participants to learn and understand the basics of soundscape thinking, 2. for participants to map and understand a place from a soundscape perspective, 3. for participants to be able to sketch a soundscape utilizing soundscape strategies and actions. At the same time, it was communicated that, as a gift and a way of thanking them for participating in workshop 2, they will receive a ticket to assist the football match.

Workshop 2 was planned to be two hours long, leaving one hour as buffer time before the game. Workshop 2 took 3 hours, we utilized the buffer hour to finish it as planned while keeping it timely in order for participants to assist in the football match. During the entire football match participants continuously identified, reflected and commented about the soundscape and the experiential opportunities in the sound environment from the built environment we were at and how those could redesign a service.

I met workshop 2 participants right outside Triangle metro station and we walked from there to a playground close by inside Fælledparken, where we conducted the first part of the workshop. Before starting the workshop, each participant was asked to read and sign consent forms where the outline of the research was explained following Aalborg Universities standards ("Consent from", 2022). See Appendix H.

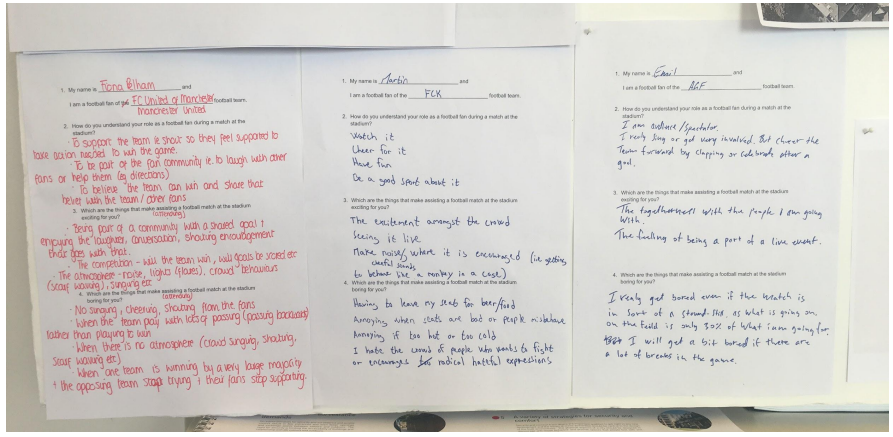


Figure 34: Survey from workshop 2 participants

Considering the learnings from workshop 1, at the beginning of workshop 2 I asked participants to fill in a brief survey with the following prompt and questions: 1. ‘My name is … and I am a football fan of the … football team.’ 2. ‘How do you understand your role as a football fan during a match in the stadium?’ 3. ‘Which are the things that make assisting a football match at the stadium exhibiting for you?’ 4. ‘Which are the things that make assisting a football match at the stadium boring for you?’ Shown in Figure 34 and full size on Appendix I. The purpose of this survey was to better understand the relationship between the participants and the experience of attending a football match in a stadium. Conducting this survey at the beginning of workshop 2 helped to establish trust and a comfortable environment between the participants. Additionally, triggered conversations that helped to set the context of the workshop. The original intention with this survey was to, after workshop 2, analyze and synthesize its answers with a method like clustering or coding in order to identify patterns that could be turned into insights (Stickdorn et al., 2020). These insights could provide user centered context to the ‘Soundscape Maps’ and ‘Soundscapes Sketches’ from the participants and ideally confirm or not the assumption-based persona, ‘Peter H’. Unfortunately, workshop 2 was conducted late in April making the original planned task for analysis and synthesis very time consuming, hence left for future explorations. On the contrary, because there were three surveys, even though a deep analysis and synthesis of the findings has not been done, they provided a good context in order to better understand each participants ‘Soundscape Map’ and ‘Soundscape Sketch’. After conducting the survey, participants were reminded of the purpose of workshop 2 and its goals.

In order to conduct workshop 2 in the field, where the actual built environment of the soundscape associated with the service touchpoint was, required some additional planning and

preparation. For each participant I created a toolkit that served as a soundscape generative design toolkit (Sanders & Stappers, 2018), shown in Figure 35. This generative design research toolkit consisted of: an A3 foam board – intended to be use as a support for participants to work more comfortable in the field –, 'The Soundscape Cards' toolkit – in this case as shown in 4.2.6 –, a plastic envelope with A3 size versions of the 'Soundscape Journey Map', 'Soundscape Map' canvas and 'Soundscape sketch' canvas; and lastly, a plastic bag – as a improvised pencil case – with dot stickers and markers with aligned with the color code of the 'The Soundscape Cards' toolkit.

Implementing the suggestion from workshop 1 participants in relation to reducing the amount of cards and creating posters for the shared soundscape vocabulary, strategies and actions, proved to have been a valuable iteration to the 'Soundscape Cards' toolkit. Regarding the reflection from workshop 1 participants, where it was suggested to add visual representations to the soundscape actions for easier identification, participants from workshop 2, unconsciously, challenged when they actually took time to read them. Reading is, in a way, working with sound as a medium, because while we read we can 'hear' mentally what we are reading, making us relate to the content from a different place. Hence it can be argued that reading is a more soundscape approach to other visual representation of content. Again, this topic, as much as being relevant to explore in order to better understand how to work with sound and soundscape in service design, is outside the scope of this thesis and left for future exploration.

Figure 35: Soundscape generative design toolkit

Following the survey, each participant received its workshop 2 toolkit. Similar as conducted during workshop 1, participants were introduced to 'The Soundscape Cards' toolkit, its proposed shared soundscape vocabulary, the 'Let's start by listening to the soundscape' activity and the 'Sound Card Example'. At this moment, the 'Let's start by listening to the soundscape' activity was conducted, participants were asked to not choose the sound event of 'Birds Chirping' because that is the sound event used in the 'Sound Card Example'. Participants were given ten minutes to

perform this task, Figure 36 shows this moment and Figure 37 the outcomes of it.

While participants were performing this task, as an attempt to later explore working with sound as a medium within service design for soundscape thinking, I recorded a one minute reference of the soundscape from this moment with my phone (Appendix J). To create this audio recording, I utilized an app called 'Audio Recorder - Voice Memos' for the iPhone ("Audio Recorder, Voice Memos", 2022), which its free version allows to register mono 48KHz PCM (.wav) files at 16 bits. I am aware that from a technical sound and soundscape perspective this is less than optimal for a professional soundscape recording (Kang & Schulte-Fortkamp, 2016). Starting by being a mono aureal recording and the low fidelity of iphone microphones for this purpose, to name a few. Nevertheless, the intention was to be able to have a sound reference of this soundscape, no matter how low its fidelity was, in order to later be able to explore it with the outcomes of this task. At the same time, this was intended as a test for the 'Sound Reference' sections included in the 'Journey map for soundscape thinking', 'Sound Cards', and 'Application of Actions' cards in order to find out if it is relevant to have them.

As in workshop 1, participants from workshop 2 were able to conduct this task without challenges. Again, the 'Sound Card Example' was an important part of this success. Participants were able to identify a sound event in their soundscape, describe what was generating it, categorize it, annotate how it relates to the experience of the place, how they perceive it and identify actors involved with that sound event. While sharing each participant the sound event they chose for this activity, the conversations were directly connected to the experiential opportunities these sound events and its actors have in the contemplated built environment.

Figure 36: Users performing 'Let's start by listening to the soundscape' activity

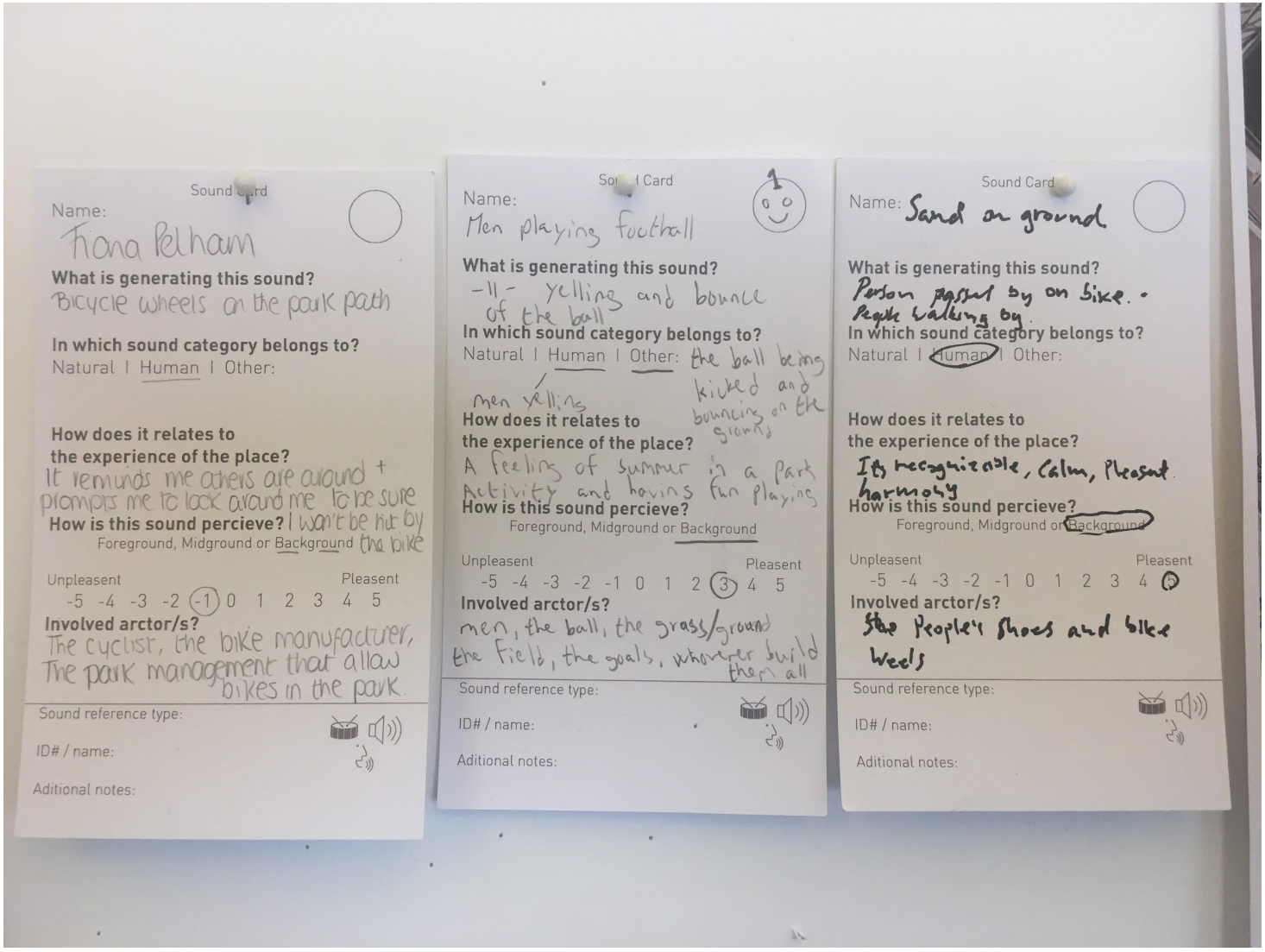


Figure 37: Users 'Let's start by listening to the soundscape' 'Sound Cards' outcomes

At the same time, participants were adopting the proposed shared soundscape vocabulary from ‘The Soundscape Cards’.
While sharing with the rest of the group the sound event each chose and the content from the ‘Sound Card’, participants became aware of the importance of soundscapes in relation to the experience of a built environment. Almost instantly, participants started sharing thoughts about different contexts where this type of ear cleaning activity (Schafer, 1994) could be beneficial to conduct. For example, one of the participants, who works for the sustainable event industry, mentioned how soundscape thinking could be very relevant for students and professionals working on services related to the event industry. Service designers could be the facilitators of soundscape thinking for the design process of an event. Even though a football match is a service associated with an event, the exploration of service design for soundscape thinking in the context of the event industry and the event design process is a larger topic and outside of the scope of this thesis. Hence suggest for future research. Having already learnt the soundscape shared vocabulary and applied it during the ‘Let’s start by listening to the soundscape’ activity, participants were ready to map a soundscape associated with a service touchpoint.
At this point, participants were introduced to the assumption-based service case, the football stadium as a service, its main actor’s journey and its touchpoints associate with soundscapes, ‘The Soundscapes Journey Map’, the pre-selected soundscape associated with the service touchpoint they were going to work with and the individual ‘Soundscape Map’ canvas of the built environment of that soundscape.

Figure 38: User mapping soundscape in the field

With the intention of being able to compare the outcomes of both workshops, the soundscape associated with a service touchpoint explored during workshop 2 was the same one explored by city makers in workshop 1. We walked to the place where the soundscape is located and there participants were asked to map the soundscape’s sounds and involved the actors' current state.

Participants were asked to listen and use the ‘Sound Cards’, dot stickers, markers and the ‘Soundscape Map’ canvas in order to perform the task. Thirty minutes were given to perform this task and five minutes were used to share with the group the sound events each mapped. This soundscape mapping method is inspired on Schafers ‘Soundwalk’ method, where an exploration of a soundscape of a given area using a score as a guide, which consist of a map drawing the listener’s attention to unusual sounds and ambiences to be heard along the way (Schafer, 1994).

Figure 39: User mapping soundscape in the field

Figure 40: User mapping soundscape in the field

One of the participants confused the ‘Soundscape Sketch’ canvas with the ‘Soundscape Map’ canvas during the task, as Figure 42 illustrates. This did not interfere with the task, yet it might indicate that the ‘Soundscape Map’ and ‘The Soundscape Sketch’ canvas required an iteration regarding how to identify each of them easily. An option for such iteration could be related to adding some kind of color coding This exploration and its relevance is suggested for future research.

Figure 41: User ‘Soundscape map’

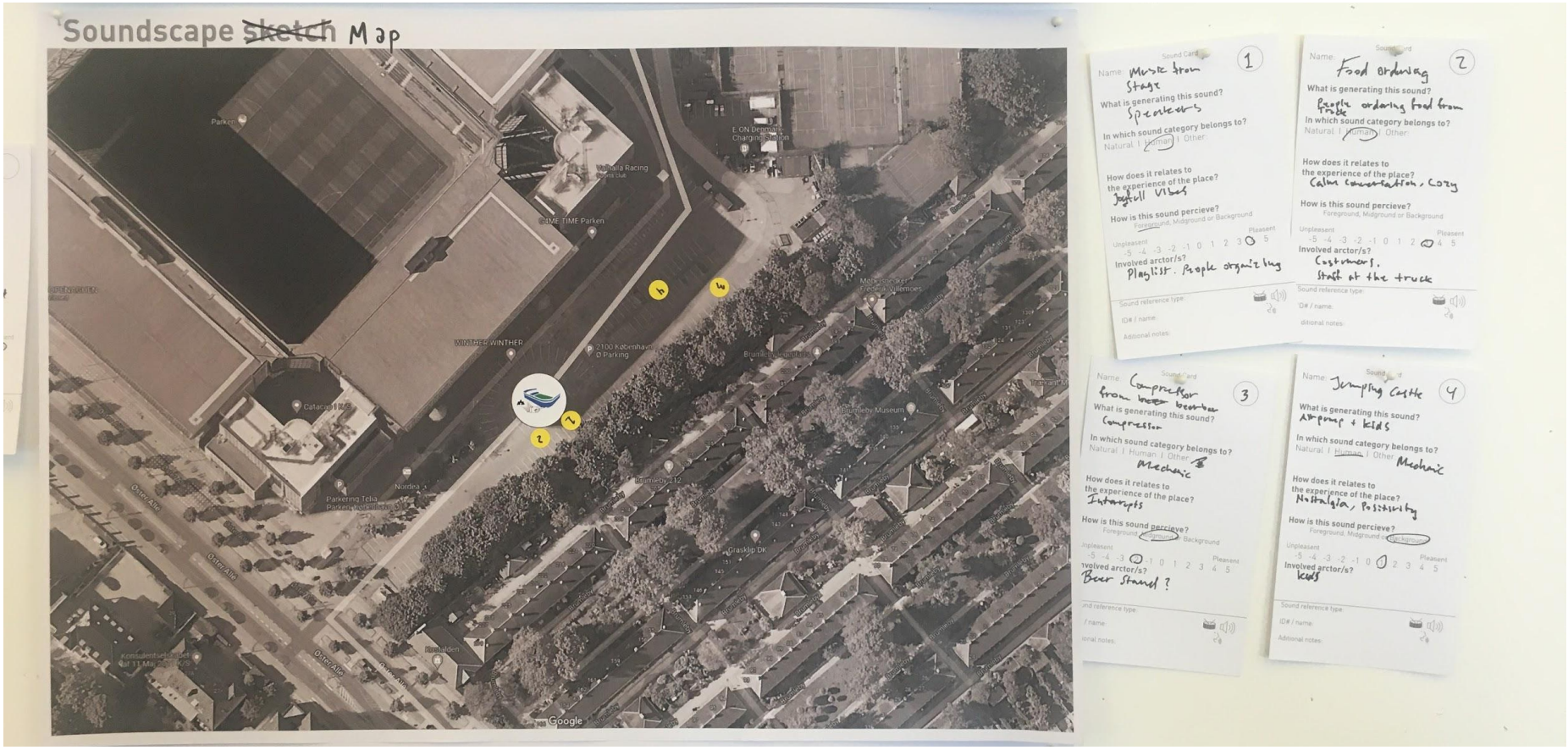


Figure 42: User ‘Soundscape map’

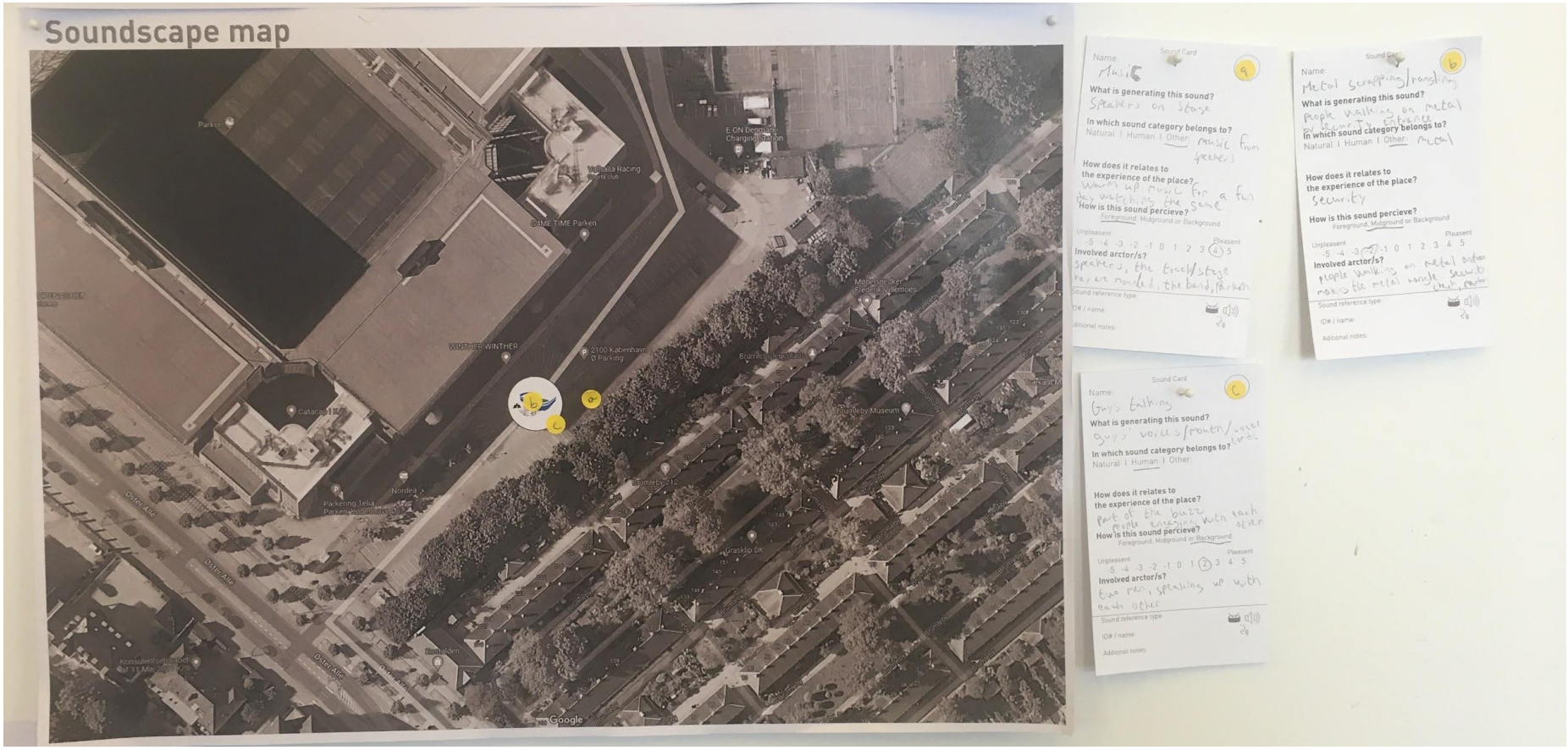


Figure 43: User ‘Soundscape map’

On the other hand, another participant wrote her own name in the ‘Sound Card’ where it says ‘Name’. This space was introduced to participants in order to write the name of the sound event they were mapping. This observation made me realize that, to avoid similar confusions in the future, the next iteration of the ‘Sound Card’ needs to say ‘Sound name’ instead. Besides these two situations, participants were able to identify sound events in the soundscape, describe what was generating it, categorize it, annotate how it relates to the experience of the place, how they perceive it and identify actors involved with that sound event. While sharing each participant the sound events mapped in the soundscape associated to a service touchpoint, the conversations were directly connected to the experiential opportunities these sound events and its actors have in the contemplated built environment. Participants were also adopting the proposed shared soundscape vocabulary from ‘The Soundscape Cards’. At the same time, during this moment of sharing it was observed how the participants were already having ideas of how they would re-design the soundscape based on their preference as users of this service. For example, one participant suggested taking a soundscape action that attenuates the sound the metal fences make when users walk next to them while entering the gates at the security control. She argued that it was an unnecessary sound event that distracted from the pre-football match atmosphere.

Figure 44: User sketching desire soundscape in the field

At this moment, participants were introduced to the next task. They were introduced to the following design brief: How might we design a collective soundscape experience, where the soundscape preceding a football match enhances your experience attending the football match? Following this brief, participants were asked to sketch a desired soundscape. Participants were asked to perform this task using the ‘Soundscapes Strategies and Actions’ inspirational posters, the ‘Application of Action’ cards, dot stickers,

markers and the ‘Soundscape Sketch’ canvas. Participants were given thirty minute to perform this task and share their sketches with the group. Again the conversations were directly connected to the experiential opportunities these ‘Soundscape Sketches’ were exploring in the built environment from the service touchpoint.

Figure 45: User sketching desire soundscape in the field

When each participant finished sharing their sketch, ten minutes were used to have a discussion about the adapted service design tools and methods used during the workshop and how they can involve users in the design process of designing the soundscapes associated with service touchpoints.

Figure 46: User sketching desire soundscape in the field

Figure 47: User 'Soundscape Sketch'

Figure 48: User ‘Soundscape Sketch’

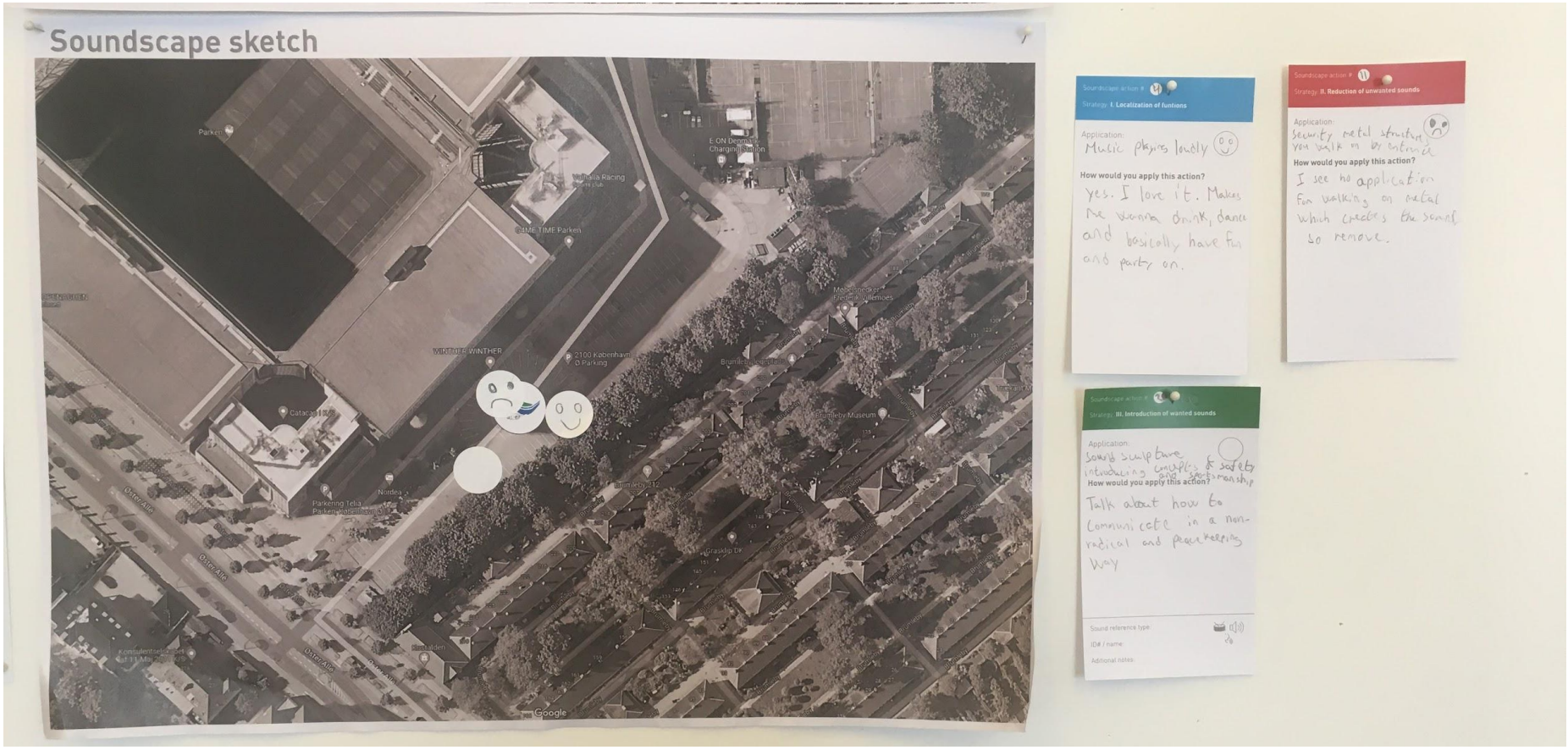


Figure 49: User ‘Soundscape Sketch’

4.4.1 Preliminary reflections on the RQ

In order for service design to help city makers understand and apply soundscape thinking for the places they are working on, participants of workshop 2 suggested that Poster 1 from 'The Soundscape Cards' – the poster introducing the suggested shared soundscape vocabulary shown in Figure 13 – could introduce the shared vocabulary incorporating the 'Sound Card Example' sound event also as an example in the content. Making the soundscape vocabulary, in this way, more tangible and simple to understand. This suggestion aroused when repeatedly I was in need to provide verbally examples of each soundscape concept while introducing them. I believe this is a relevant iteration to make and test. Sadly, because of time limitations, this was an iteration for 'The Soundscape Cards' I needed to leave for future explorations.

The participatory direct observation (Bjørner, 2015) conducted during workshop 2 suggests that during the tasks of soundscape mapping and sketching, participants spread into different places in order to work, instead of staying in one place together for the tasks. At that moment I realized that when conducting the 'Let's start by listening to the soundscape' while staying as a group, some sounds events from participants, like a spontaneous question, was taking over other participants' soundscape, similar to the sonic citizenship concept suggests (Koldkjær Højlund et al., 2021). This involuntary or unaware interruption distorts other participants' sonic tasks. This observation made me reflect about which is the correct method to conduct this type of group soundscape mapping when each participant is mapping and composing the soundscape at the same time? Sometimes participants have inquiries during tasks and it is important to address them. Yet, the challenge is that if they speak they interfere with the rest of the participants' soundscape therefore, interfering with the soundscape mapping or sketching. A potential solution to this challenge is to ask participants to spread, within certain distance limits in order to be mapping the same environment, and the facilitator to stay within a certain distance at a meeting point. This approach, allows for participants with an inquiry or those who are done with a task, to meet the facilitator without, or reducing, taking over other participants soundscapes. This observation, presents how working with sound as a medium presents new challenges at different levels of the service design process and requiring new approaches, like for example while conducting generative design research with users in the field. This topic, even though very relevant, falls close but outside the scope of this thesis, leaving it for future research.

On the other hand, recording the soundscape references with a phone proved, after workshop 2, to be a good practice in relation to working with sound as a medium for soundscape thinking while conducting generative design research with users in the field. Reproducing these recordings while reviewing the outcomes of each task, provided perspective and more context to the outcomes of the workshop. For example, which sound events participants acknowledge from a soundscape and which other sound events were present or registered by the recording. These recordings, even

though having a poor technical quality, additionally informed conversations about the outcomes of the workshop with city makers providing nuanced insights from the soundscape and its context in relation to its built environment. For example, it was noticed that even though the playground where ‘Let’s start by listening to the soundscape’ activity was conducted was relatively close to the stadium, none of the sound events generated previous the football match were being registered from that point or noticed by the participants. At its most basic level, it provided city makers, who were not present during workshop 2, a general sound reference of the feeling of the soundscape and also worked as a reminder of it for me, the researcher, who was there. My intention by including the ‘Sound Reference’ sections in the ‘Journey map for soundscape thinking’, ‘Sound Cards’, and ‘Application of Actions’ cards, and testing them by recording sound references of soundscape is to emphasize the importance of starting to work with sound as a new medium in service design. The method/s of how to do this, I believe is an important topic to be explored, though it falls outside the scope of this thesis, and therefore leave for future explorations. Figure 50 shows the outcomes from workshop 2 and the bluetooth speaker used to reproduce the sound references audio files, Appendix K.

Service design can help city makers understand and apply soundscape thinking for the places they are working on from the perspective of the people part of those places. Service design tools and methods adapted for soundscape thinking can give people the opportunity to express and sketch in the way that makes better sense for them a desired soundscape. These adapted tools and methods give enough freedom for users to express aspects related to a soundscape from who they are and their own experience of a place. These adapted tools and methods provide a common soundscape vocabulary that facilitates an easy incorporation of this input into the city making process. For example, a participant can use happy and sad faces to associate the way they believe a soundscape actions should be applied to a built environment associated with a service touchpoint, as shown in Figure 49. Another example can be seen in Figure 47 where a different participant grouped soundscape actions as ‘10a’ and ‘10b’ because she understood the combination of both these individual applications of soundscape strategies and action as a whole thing. In this way, service design can provide city makers with nuanced people-centered insights about the soundscapes of the places they are working on.

Service design, simultaneously, can help city makers identify and understand soundscape thinking opportunities for the places they are working on from the perspective of the people using those places. For example, during workshop 1 city makers were discussing the possibility of applying soundscape strategies and actions as a way to activate the soundscape of the neighborhood next to the football stadium. The goal was to provide value to the soundscape associated with the neighbors during a football match. Most city makers found this idea positive and aligned with making the city for

people's well being. During workshop 2, participants identified various sound events and its associated actors that they believed would enhance the service experience of those touchpoints, from a soundscape perspective, if they were relocated and minimally adapted. What city makers and football fans, with slightly different intentions, were suggesting in order to enhance the soundscape experience of those places were complementary soundscape strategies and actions. Basically, the idea was to relocate the food trucks, bar kiosks and entertainment attractions in order to activate the soundscape associated with a different place of the service touchpoint. Identifying and understanding soundscape opportunities from a people-centered approach, like the previous mentioned, is another way service design can help city makers understand and apply soundscape thinking for the places they are working on.

Figure 50: Workshop 2 outcomes including speaker to reproduce the soundscape references audio files

4.5 Presentation of learnings to city makers

With the purpose of presenting the learnings and suggestions from this project to city makers from Gehl Architects and other relevant actors related to the company, I gather all the learnings, insights and ideas derived from the design process and the workshops into a provisional project report shown in Figure 51 – Appendix L.

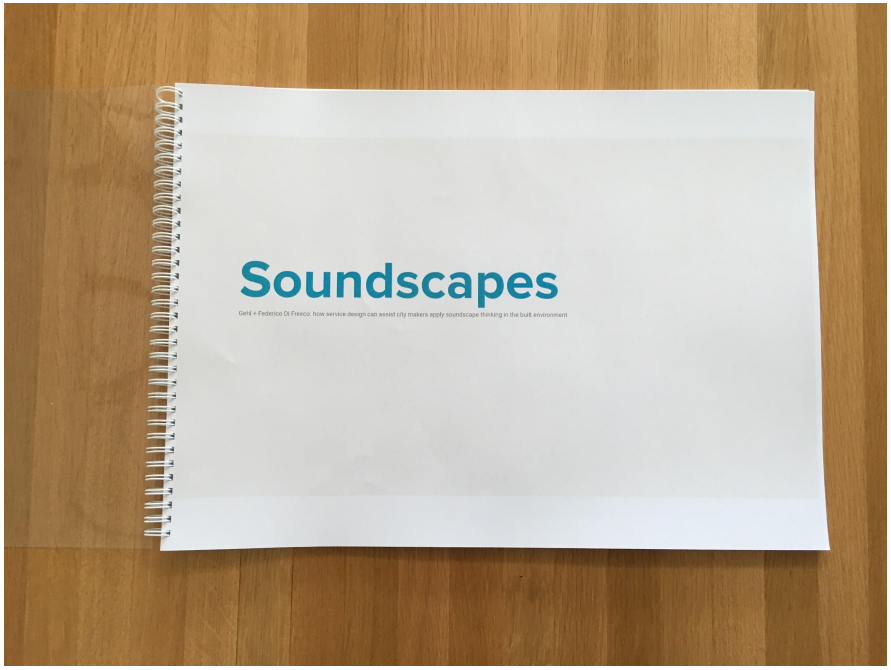


Figure 51: Printed project report

The full and final version of the project report is planned to be delivered to Gehl Architects at the end of the month of June.

Additionally, with the purpose of presenting and sharing these learnings in more depth, a 30 minutes talk is also planned for the month of June with all city makers from Gehl Architects. This talk will follow the 'Lunch talks' format Gehl Architects regularly uses as a knowledge sharing platform within the company.

Figure 52: City maker exploring the printed project report

The provisional project report introduces the importance of contemplating soundscapes in the city making process and the importance of the adapted service design tools and methods for soundscape thinking and 'The Soundscapes Cards' toolkit in order to do so. Furthermore, it introduces the actors who can use these

tools, methods and toolkit, the context and a description of how to use them. Lastly, it showcases the activities conducted during workshop 1 and 2 as real life examples of how it could be to implement these tools and methods for soundscape thinking in a city making project. This report has been first introduced to city makers and other relevant actors during the international community event ‘Kin days’, part of the Kyu collective ("Kyu", 2022) which Gehl Architects is part of. During the ‘Kin days’ event hosted at Gehl Architects studio in Copenhagen this project report’s printed version was presented together with other tools and methods Gehl Architects currently is using or developing for city making as shown in Figure 52.

Beside sharing the acquired knowledge with city makers, this report aims to inspire city makers to reflect about the importance of contemplating soundscapes in the process of making cities and encourage them to consider the experiential possibilities in the sound environment of the places they are working on from a people-centered perspective.

5. DISCUSSION

This chapter discusses the academic research question based on the findings from the case study. It elaborates on how service design tools and methods can assist city makers understand and apply soundscape thinking for the places they are working on, the potentials and challenges identified, and how it affected my role as service designer. Furthermore, it addresses the potential of using these tools and methods adapted for soundscape thinking in a city making context. Lastly, this chapter discussed how a soundscape thinking focus can impact service design in general, how it can broaden the perspective on service design, outcomes and value contribution. This chapter also discussed the official and personal learning objectives.

Discussion sub-chapters:

5.1 Further reflections from the design process
5.2 Further reflection from the research question
5.3 Reflections from the learning objectives

5.1 Further reflections from the design process

A core part of this project was the design process of exploring which service design tools and methods would make sense to adapt for soundscape thinking and how to do it. The goal was to redesign service design tools and methods to later test them during workshop 1 with city makers and workshop 2 with users. Hence the following further reflections arise from the observations of this design process. The reflections will be presented in non particular order.

5.1.1 Harmony rests between tensions

This thesis design process explored different questions like: which service design tools and methods would make sense to adapt for soundscape thinking? How is the correct way to adapt a service design tool or method for soundscape thinking? Do these adapted tools and methods serve the purpose of facilitating city makers and service designers soundscape thinking for their design process? Can these service designs adapted tools and methods involved users in the design process from a soundscape perspective? Each of these questions has been addressed as deeply as the scope and the limitations of this work allowed to. The overarching scope of this thesis, a bigger challenge than what I thought it was when I chose it, generated tensions at the moment of trying to explore in depth each of these, I believe, important questions in order to move to the next necessary step to complete this work. Reflecting retrospectively, I noticed how each of these explorations were similar to a design sprint one after the other, as Jake Knapp presents his book: “How to solve big problems and test new ideas in just five days” (Knapp et al., 2016). This compact design process explores big and complex challenges fast in order to get a tested functional minimum viable service/product in five days. This presented reflection makes me think that maybe conducting an actual design spirit in order to address each of these questions could have been a more appropriate approach to addressing the

various big challenges explored in this thesis. Possibilly, providing a better structure and agile documentation of the design process. The overarching scope of this thesis did create tensions in each of these explorations, implicating big trade off decisions for moments, yet it allowed to conduct these explorations enough in order to move to the next question, like in a design sprint. In the end, these tensions facilitated a compat exploratory design process of a big and complex topic, service design for soundscapes in a city making context, while allowing to deliver tested minimum valuable service design tools and methods for soundscape thinking. In this way, similar to the combination of time boxed and focus design process during a design sprint, the tensions provided by the overarching scope of this thesis and the limitations of this work provided also some harmony to the outcomes of this design process. Having said this, the outcomes of this thesis design process should be understood as such too, the outcomes of a combination of design sprints awaiting further exploration and testing.

5.1.2 Sound in the services design process

When we, service designers, conduct research through design we try to triangulate (Bjørner, 2015) (Sanders & Stappers, 2018) (Stickdorn et al., 2020) methods and sources in order to try to embrace the exploration of a topic from different perspectives. Yet, when it comes to designing services we normally tend to stick to our visual sense, and design primarily visual concepts, and use tools and methods that are visually driven. Something Kustrak Korper et al. also points out (Kustrak Korper et al., 2020). This situation is such that even though from the beginning of this work, where I was trying to use as much sound as a medium for service design and the exploration of soundscapes as possible, I felt that it was first needed for service design tools and methods to be adapted in order to contemplate sound and soundscapes in them. In retrospect, based on the knowledge I had at this moment in time, I reflected on how the topic of service design for soundscape in the context of city making could have been explored if at least some service design tools and methods were already adapted to contemplate sound in the design process. I believe the exploration of soundscape thinking in service design for city making could have been explored by actually working more with sound as a medium instead. My hope is, with this reflection, to inspire service designers to re-explore the topic of this thesis with the opportunity to work closely with sound as a medium in service design, giving the opportunity to other service designers to listen to the learnings sound as a medium can provide to service design for soundscape thinking.

5.2 Further reflections from the research question

Since the research question of this thesis explores how service design can help city makers understand and apply soundscape thinking for the places they are working on, the key findings from the research question arise from the design process of adapting service design tools and methods for soundscape thinking and the participatory direct observation (Bjørner, 2015) conducted during the two workshops held utilizing those tools and methods. Workshop 1 with the city makers and workshop 2 with the users of the service case in the field. The reflections will be presented in non particular order.

5.2.1 The value of listening to and contemplating soundscapes

During both workshops hosted for this thesis, first with city makers and second with users of the service case in the field, the adapted service design tools and method showed to be valuable for assisting city makers understand and apply soundscape thinking for the places they are working on. One challenge though, of working with soundscapes, is the need for city makers to stop and listen. This might sound obvious, but while working with soundscape in a busy environment like the one city makers are part of, requires an effort to take the time to stop and listen in order to contemplate soundscapes in the design process. I will assume, based on my personal experience, that this would be a similar case for service designers too. The reflection comes from the observations that every participant rapidly recognized the value of listening to soundscapes and contemplating them in the design process. Regardless that the service case used for this thesis was an assumption-based service case, and it is left for future research to test these suggested tools and methods in real cases, during both workshops participants learnt and applied the basic concepts of soundscape thinking to the case at hand. In retrospect, an important part of the value this adapted service design tools and methods provide to city makers for their design process is first, to designate time for soundscapes, and second, the facilitation of how to listen and contemplate the soundscape of the place they are working on. City makers acknowledge the value of soundscapes in the built environment, yet lack simple tools and methods to contemplate them, hence making it hard for city makers to assign time for it too. The service design tools and methods adapted for soundscape thinking proposed in this thesis enlightened city makers and users on a deeper understanding of soundscapes, how they could be contemplated in the design process and the importance of doing so. Additionally, they proved to provide value in order to incorporate the users in the design process as a way to have a more nuanced understanding of those soundscapes. As soon as time to listen and contemplate soundscapes associated with a service touchpoint with the suggested tools was given to city makers or users, it was simple to hear the value of their reflections and conversations about the soundscape. Still, these adapted tools and methods require testing in different types of projects and further developing based on those learnings. And they also face the real challenge of which is going to be the business model that will incorporate and implement them, who is going to pay for implementing them? This was another observation out of conversations with city makres.

5.2.2 The importance of a shared soundscape vocabulary

Having a shared vocabulary about a topic, like in any discipline, is crucial to be able to have reflective conversations with the situation at hand and conduct a design process which involves many different actors. A shared soundscape vocabulary, like languages, presents the challenge that a relevant amount of people needs to use it in order to become established as a shared vocabulary.

Within the service design and city making disciplines, where a great variety of different actors, including me with the case of this thesis, are suggesting different vocabularies, tools, and methods, it becomes a challenge to establish a new shared vocabulary to address a topic. This falls outside the scope of this thesis, yet probably a good reflection for future research.
Regardless of this challenge, the service design tools adapted for soundscape thinking were shown to be successful in: first, presenting the context of a soundscape, and second, establishing a shared soundscape thinking vocabulary in order for city makers and users to have reflecting conversation with the case at hand from a soundscape perspective. Even though successful in these two workshop contexts, these tools and methods like any language would also need to develop and evolve over its use in time in order to stay relevant. For example, exploring how these tools and methods could sharpen even more the vocabulary related to soundscapes by incorporating the soundscape psychoacoustic concepts of loudness, sharpness, roughness and fluctuation strength (Kang & Schulte-Fortkamp, 2016). Yet, as presented in this thesis, based on the observations of the two workshops, service design can help city makers understand and apply soundscape thinking for the places they are working on by facilitating a shared soundscape vocabulary.

5.2.3 The importance of keep exploring soundscapes
Soundscapes are complex, Schafer (Schafer, 1994), Jian Kang et al (Kang & Schulte-Fortkamp, 2016), Cerwén (Cerwén, 2017), and Koldkjær Højlund (Koldkjær Højlund et al., 2021) make it clear on their explorations as well as the different approaches and methods that could be used to contemplate them in a design process. Soundscape studies also covers a broad and rapidly growing field (Kang & Schulte-Fortkamp, 2016). Service design has not explored enough sound as a medium or soundscapes in services, nor in accademia or in practice, at least to my knowledge at the time of finishing this thesis. This makes it important for service designers to keep exploring soundscapes in service design, from an academic perspective and within the service design practice too.

5.2.4 The role of service designers for soundscape thinking
Antonella Radicchi states that there is still an urgent “need of multidisciplinary approaches to evaluate the qualitative and perceptual peculiarities of the urban sonic environment that can successfully guide possible interventions within the complex, stochastic processes that create an acoustic environment” (Radicchi et al., 2020). Radicchi presents the idea of an ‘urban soundscaper’, a person or team, with the task of seeking to realize actual improvements in the soundscapes in order to improve the lives of people living in cities. Service designers, especially those with a background in sound studies, can become soundscapers or part of a soundcaper team. As the research for this thesis showed, service

designers can facilitate soundscape thinking to other professionals in order to have a common soundscape vocabulary and method to include multidisciplinary actors in the process of contemplating soundscapes associated with the built environment of an actor's experiential journey touchpoints. Following a similar line of thoughts, it could be suggested the role of 'service soundscaper', as a specialization under the service system design discipline focused on researching, designing, managing and adjusting the soundscapes associated to the service touchpoints. It could be an individual or, as the 'urban soundscaper', a team too.

5.2.5 The value of service design for soundscape thinking

Service design for soundscape thinking would broaden the way service designers research, design, manage and adjust services. Giving place for sound and soundscapes in the service design process, service designers would improve the service design process, its outcomes, contribution and consequently its value. The first step proposed, based on the outcomes from the research of this thesis, is the use of journey maps and service blueprints adapted for soundscape thinking like the 'journey map for soundscape thinking' explored in the research of this thesis. When referring to service blueprints for soundscape thinking, the time limitations of this thesis didn't allowed to explored it in depth, yet the explorations conducted during the adaptation of the service design tools and method for soundscape thinking suggest that it should be simple and valuable just to implement one or two soundscape sections – one for the front stage and one for the back stage activities – in a service blueprint similar to the one implemented in the 'journey map for soundscape thinking'. In particular Lane 5. 'Key soundscape actions' where the actions required to achieve the desired soundscape for that service touchpoint are visualized. An in depth exploration of service blueprints for soundscape thinking would be a valuable future research topic.

5.2.6 Challenges of soundscape thinking

Probably the biggest challenge soundscape thinking faces is that most people when thinking about soundscapes, think about noise management. Noise is simply an unwanted sound in a specific context. If we start thinking about the experience of a sound environment as merely reducing noise, we are treating sound as a waste product of the environment. Instead, as shown in the literature review of this thesis, most authors suggest that the soundscape of a place, in one way or another, is a person's perceptual construct of the sound environment of that place. Allowing to shift the understanding of the sound environment towards a soundscape approach is the biggest challenge soundscape thinking has. That is why the adapted service design tools, methods and toolkit originated from the research of this thesis suggest a shared soundscape vocabulary in order to start narrowing this conceptual gap.

5.2.7 Service Design for soundscape thinking in city making

In city making “the recent management of the acoustic environment has predominantly been concerned with reducing or masking sound levels” (Kang & Schulte-Fortkamp, 2016) becoming an important challenge in order to start understanding and designing the sound environment from a soundscape perspective. Service design for soundscape thinking can provide city makers another way to measure and understand the health of the places they are working on, similar to what David Haskell suggest about listening as a way to explore the health of natural environments ("David Haskell: biologist, listener, explorer of sonic landscapes - Dumbo Feather", 2022), or when Shannon Mattern proposed that “how we listen to the city is as important as what we are listened for” (Mattern, 2020) in her article about urban auscultation. Service designers, as the research of this thesis showed, can also use these service design adapted tools and methods for soundscape thinking to support the research, design, management and adjustment of special design manuals like the one the city of Struer, “the City of Sound” ("The city centre of Struer becomes "The City of Sound" by following a special manual", 2022), develop in order to develop the city of Stuer contemplating its soundscapes ("Struer bymidteplan", 2022).

5.3 Reflections from the learning objectives

5.3.1 Reflections form the academic objectives

This thesis gave me the opportunity to further strengthen the service systems design skills I have already acquired during this masters program, obtain new ones and apply them within a topic and context it matters to me. Soundscapes in city making, the topic and the context addressed in the case study, was furthermore complex and therefore appropriate to demonstrate my capabilities. This thesis project allowed me to apply a methodological approach and methods often used in service systems design and complement my practice with approaches and methods from other fields of studies, such as soundscape studies in the context of city making from a people-centered perspective. The service design approach and methods allowed me to deal with the complexity of the context, through for example analyzing and synthesizing complex materials into adapted service design tools and methods for soundscape thinking as well as in the preparation and facilitation of the workshops with city makers at the international urban strategy and research consultancy and with the users of the service case in the field. The approach borrowed from soundscape studies and the soundscapes strategies and actions borrowed from Cerwén (Cerwén, 2017) work, provided me the support to expand and advance the perspective of service systems design. The activities I conducted for this thesis demonstrates an understanding of the service systems design field, that I can make use of the opportunities it provides, while being able to be aware, consider and compensate for its flaws.

5.3.2 Reflections form the personal objectives

By working on this thesis, one of the main personal learning objectives I achieved, after great effort, was to expand my theoretical and practical knowledge about how service design can facilitate soundscape thinking to help city makers understand, design and build healthier soundscapes. I learned how to conduct a research contribution that, I can only hope, motivates people to include soundscape thinking in their design processes towards healthier, equitable and sustainable environments that enhance people's well being. The research conducted for this thesis allowed me also to, I believed, contribute to further expand the understanding of service systems design and the role of service systems designers towards meaningful soundscapes design for everyone.

6. CONCLUSION

The key findings related to the research question are presented and summarized in this chapter. Furthermore, presents the limitations of this study and possible areas for future research.

Conclusion sub-chapters:

6.1 Key findings
6.2 Limitations
6.3 Future research

6.1 Key findings

This thesis has explored how service design methods can assist city makers understand and apply soundscape thinking for the places they are working on. For the research, a case study has been conducted within the context of city making. Service design methods had been adapted for soundscape thinking and a toolkit to facilitate soundscape thinking was designed. Both, the adapted service design tools and methods, and the toolkit for soundscape thinking had been put to test during two workshops. The first workshop was conducted with city-makers from an international urban design and research consultancy in Copenhagen, while the second workshop was conducted with the main users of the service case in the field. This exploration left me with findings and reflections of how different approaches to the service design process would impact a project and the practice of service design.

The research suggests first, that the 'Journey map for soundscape thinking' allowed city makers to consider the experiential possibilities in the sound environment of a place from a people-centered perspective while contemplating its experience's journey and context. The 'Journey map for soundscape thinking' showed potential for helping citymaker research, design, manage and adjust the soundscapes associated with the built environment of an actors' experience journey touchpoints. It also showed potential in being a process that service designers can facilitate in order to help city makers understand and apply soundscape thinking for the places they are working on. At the same time, 'The Soundscape Cards' toolkit proved useful for city makers to establish a shared soundscape vocabulary and consider the experiential possibilities in the sound environment of a place from a people-centered perspective. It helped city makers understand the current state of a soundscape and sketch actions in order to design a desired soundscape based on two personas and a design brief. The use of 'The Soundscape Cards' facilitated critical and reflective soundscape thinking to the city makers and complemented the use of the journey map for soundscape thinking.

Second, the research suggests that service design can help city makers understand and apply soundscape thinking for the places they are working on from the perspective of the people part of those places. The service design tools and methods adapted for soundscape thinking in this thesis gave people the opportunity to express and sketch in the way that makes better sense for them a desired soundscape. These adapted tools and methods give enough freedom for users to express aspects related to a soundscape from

who they are and their own experience of a place. These adapted tools and methods also provided a common soundscape vocabulary that facilitated an easy incorporation of the user's input into the city making design process. In this way, service design can provide city makers with nuanced people-centered insights about the soundscapes of the places they are working on.

Third and simultaneously, service design can help city makers identify and understand soundscape thinking opportunities for the places they are working on from the perspective of the people using those places. This provides the opportunity to identify where, both city makers and the people using those places, have similar, or not, perceptions of how to enhance the soundscape experience of those places. Helping service design in this way city makers understand and apply soundscape thinking for the places they are working on.

Finally, the research suggests that service systems designers can research, design, manage and adjust services contemplating the soundscapes associated with the service touchpoints by using a journey map and a service blueprint in which there is an additional section about soundscapes. In the case of a service blueprint this additional soundscape section can be located in the front stage, the back stage or both, depending particularities of the case.

Furthermore, in order to map the current state of those soundscapes associated with each touchpoint and later sketch desired future states of them, the ‘The Soundscapes Cards’ toolkit is proposed in order to facilitate soundscape thinking. This toolkit is intended as a shared vocabulary in order to be able to map and sketch soundscapes associated with service touchpoints from a people-centered perspective. However, the proposed adapted service design tools and methods for soundscape thinking and ‘The Soundscape Cards’ toolkit require further iterations and use by different actors within diverse project types in order to further develop them. Yet, this thesis can be seen as a contribution and expansion of the understanding of service design and its value in relation to working with soundscapes.

6.2 Limitations

The following outlined limitations influenced the design process and academic research of this thesis. To begin, the conducted research is limited to only one study case in the context of city making. Based on this limitation, I can not say for sure that the adapted service design tools and methods for soundscape thinking, ‘The Soundscape Cards’ toolkit, and the insights are applicable to other contexts as well. Even though I involved different and various actors in city making with the aim to adapt the service design tools and methods for soundscape thinking and later test them, I see a limitation in the fact that, primarily because of time, I haven’t involved other actors in this process. For example, the involvement of service system designers could have been valuable for insights and their perspective on how this adapted service design tools and methods would fit the service design process in different contexts. At the same time, the lack of a real case city making project limits

the complexity of conducting this research. The outcome of this research could have been different if the adapted service design method for soundscape thinking were tested during a real city making project where city makers have bigger stakes on the matter on top of being very busy. I can also see a limitation in the methods used during the project. The context and the big scope of this thesis work, made me decide to use agile methods which have limitations on the documentation of the design process impacting the research. At the same time, there is a limitation in relation to the outcomes as they are not statistically relevant as only five people participated in workshop 1 and only three in workshop 2. An important limitation of this thesis has been my personal bias in relation to soundscapes and city making, in particular to the topic of sound, two topics I have been interested in, studied and worked on for many years. This bias definitely impacted the results of this thesis. Even though the key aspects of this thesis have been researched as deeply as possible, time, as presented during this work, has left many questions for future research. Answering this question would have made me better understand the nuances related to this research and consequently providing a more profound understanding of service design for soundscapes in the context of city making. These limitations are presented also as a suggestion for future research on the topic.

6.3 Future research

During the research and design process of exploring the topic of this thesis other topics arose which I believe are relevant for future research. For example, being aware of how sound impacts the actors' experience service journey based on the context and the built environment where the actor is at can suggest the use of mobile data like GPS and time in order to change, enable or disable soundscape actions based on what research shows that would improve the actors' service experience form a soundscape perspective. On the other hand, as most literature I have found about soundscapes is mainly focused on Europe and the western world, it would have been interesting to explore soundscape studies focused on Asia, Africa, Latina America, Antarctica and the north pole in order to have a more diverse understanding of it in order to apply that knowledge to service design. At the same time, following the renewed trend of outer space exploration and designing built environments for outer space and other planets like Marts, it could have been also interesting to explore how service design for soundscapes could help design these new built environments and future cities for other space where the living conditions for humans are extremely challenging. Also, it would be interesting to explore how service design can help better understand the impact of the sound environment not only to humans but the entire ecosystem, in order to avoid for example Sound pollution and its effects in the ocean soundscapes ("Noise pollution 'drowns out ocean soundscape'", 2022). It would have,

also, been interesting to explore how service design methods could innovate Gehl's methods towards a more soundscape thinking exploration of the built environment for example: what if public life studies includes counting of people utilizing headphones vs those who do not? Would this help indicate if the soundscape is appreciated or not?; or what if it counts people utilizing outdoors speakers, playing music and other as active forms of impacting the soundscape from sonic citizenship perspective?; even further, what if street surveys are conducted to people using headphones in a specific public place vs those who don't use them? Trying to identify if there is a relationship of the use of headphones with the specific soundscape of that place. Future research could also explore how this service design methods for soundscape thinking and 'Thes Soundscape Cards' toolkit explored in this thesis could potentially become a digital and scalable online service for contemplating, mapping and sketching soundscapes in a diverse range of disciplines and practices. Finally, I believe, it is important for future research better understand how service design could facilitate soundscapes thinking in the three service logical levels: service as interaction, service as infrastructure and service as systemic institution.

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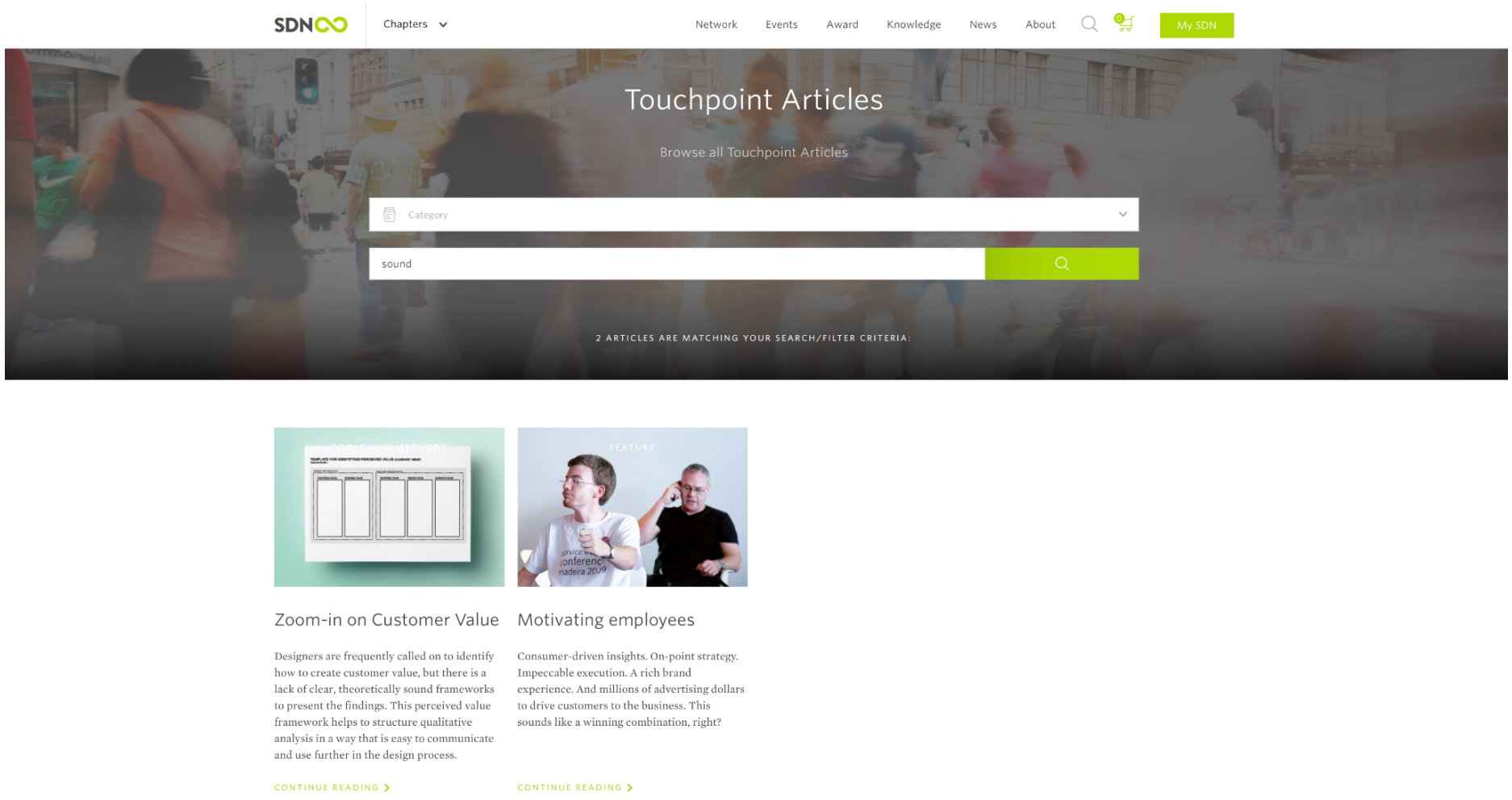
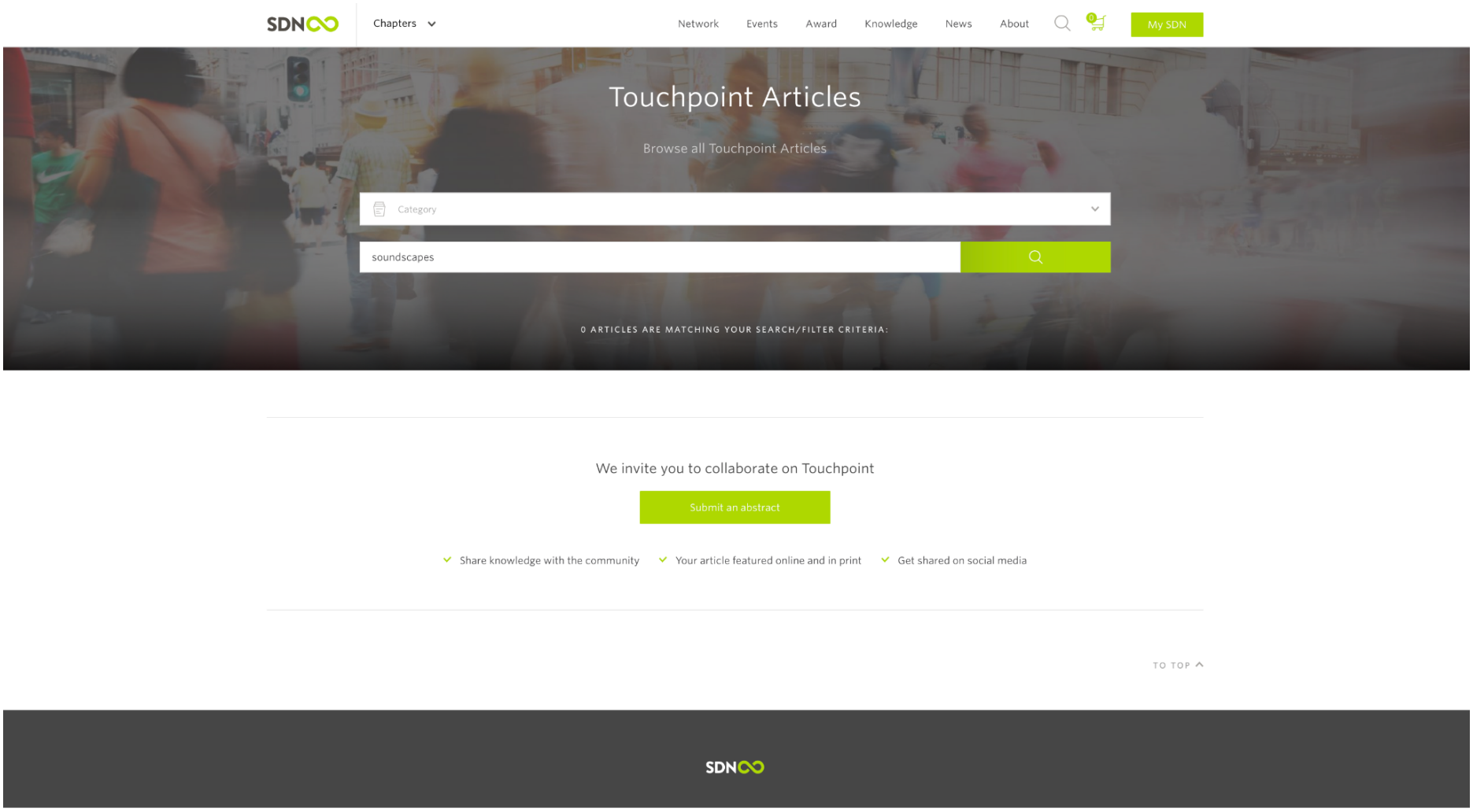
8. APPENDIXES



Appendix A - SDN website articles search results for keyword ‘Sound’



Appendix B - SDN website articles search results for keyword ‘Soundscapes’

Title:

Service Design for Soundscapes: A case study in Copenhagen showing how service design can assist city makers by facilitating soundscape thinking.

Author:

Federico Di Fresco

Study no:

20201589

Project period:

Feb 2022 – May 2022

Hand in date:

May 25th 2022