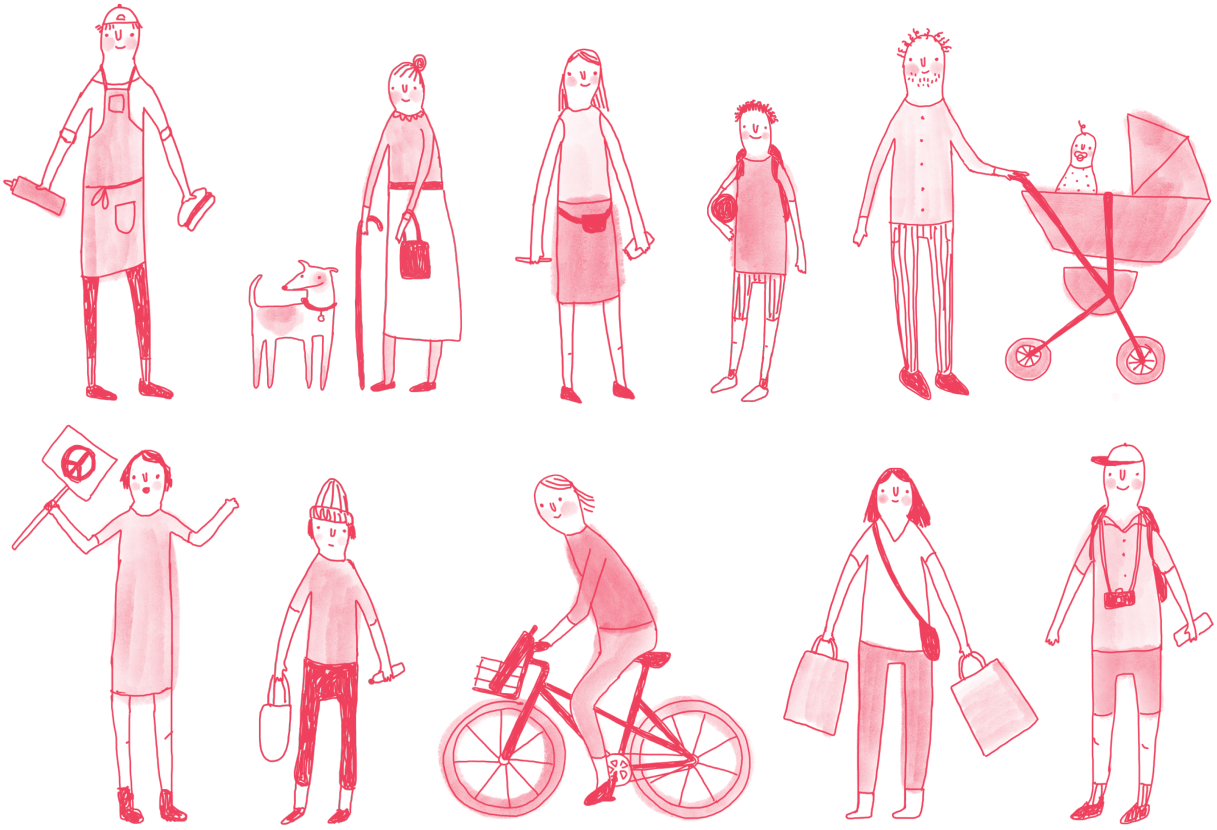


# INCREASING DIVERSE STAKEHOLDER INCLUSION IN AN URBAN LIVING LAB

*An Experiment in Design Activism*

LARA CLARE CASCIOLA – MASTER'S THESIS – PROCESS REPORT

SERVICE SYSTEMS DESIGN

***Aalborg University Copenhagen***

MASTER'S THESIS

**TITLE**
*Increasing Diverse Stakeholder Inclusion in an Urban Living Lab: an Experiment in Design Activism*

**SEMESTER**
*10th*

**PROJECT PERIOD**
*Feb 2016 - Aug 2016*

**COPIES**
*1*

**PAGES**
*Process Report - 175 pp.*

**SUPERVISOR**
*Amalia De Götzen*

**FINISHED**
*11.08.2016*

**AUTHOR**
*Lara Clare Casciola*
*Study no. 20142707*



*Aalborg University Copenhagen A.C. Meyers Vænge*
*2450 København SV, Denmark*

# *Abstract*

This thesis explores the practice of design activism by applying it to a real-world case. Street Lab, a newly-launched urban living lab in Copenhagen city centre, is billed as a place where smart city technology is developed. In its current form, participation in the project is limited to technology companies. Design activism was applied here to promote and develop a more inclusive strategy with Street Lab's governing actors. A series of gradually more disruptive designed artifacts were introduced, with the aim of slowly pushing the these actors towards a new, more user-centred mindset.

The process was successful in that each artifact was positively received and collaboratively developed. A longer timeframe is needed, however, to assess whether any lasting impact to Street Lab's direction is manifested.

# *Acknowledgements*

Many, many thanks to Amalia de Götzen, my official supervisor at Aaborg University, and Christian Villum, my unofficial supervisor at the Danish Design Centre, who both played a crucial role in shaping this thesis.

Thank you also to Nicola Moretti and Peter Munthe Kaas, who provided much expertise, and to Sune Fredskild and the rest of the Copenhagen Solutions Lab team for their time and patience.

Finally, thank you to my classmates, colleagues, and friends for providing constant, invaluable advice.

# Contents



## ABBREVIATIONS

**AR**: Action research

**AAU**: Aalborg University

**CPH**: Copenhagen

**DA**: Design Activism

**DDC**: Danish Design Centre

**DS**: Design Science

**CSL**: Copenhagen Solutions Lab

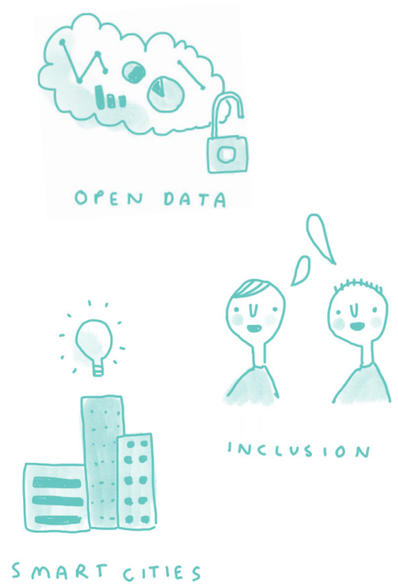
**SD**: Service Design

# CONTEXT

*This thesis is the culminating work of a master's degree in service design. Written over the course of six months, it explores a subject area which I have a particular fascination: shaping an inclusive, sustainable future for our cities.*

## Starting point

The initial steps of this work consisted of distilling my interests into key concepts, and then seeking project opportunities that dealt with these concepts. Previous educational experience had introduced me to the challenges and opportunities related to 'smart cities', 'open data' and 'inclusion in urban development' as conceptual areas (see pp. 9 - 10), and impressed upon me the need for further research and design work dealing with the intersection of these subjects. I therefore focussed on these topics when seeking out project opportunities. This decision set the course for the following work: my partnership with the Danish Design Centre, collaboration with Copenhagen Municipality, and focus on a smart city living lab (all described in the following pages) connect directly back to these three initial interest areas.




## Learning goals

The Service Systems design master's program at Aalborg University Copenhagen (referred to from here on as AAU) lists the following in its curriculum as the basic goals of this thesis:

– Independent identification of a problem

– The use of appropriate design methods and theory to research the problem area

– Designing and presenting an innovative problem solution

In other words, I should leverage my research and analysis skills to correctly pinpoint an solvable, appropriately-scaled issue. I should then use the design research tools associated with a service design approach (see p. 5) to look into the factors surrounding the issue. Finally, I should conceptualize and describe a designed artifact which solves the problem, or alleviates some of the pain points surrounding it.

My own, personal thesis goals are:

– To explore design research methods, with the goal of becoming more comfortable with choosing and manipulating the appropriate research method for the situation

– To explore the analysis phase of my research, and refine my technique for sorting through and gathering workable insight from qualitative research

– To correctly identify the most appropriate solution format in light of the problem – ie. should the solution take the form of a new service concept? Or would the problem be better solved with a series of recommendations?

– To deliver an impactful solution, with real world ramifications

See p. 83 for an assessment of whether these goals were met.

# *Project Management*

*To structure project progression, two tools were utilized: a conceptual model of the design process, and an agile development framework.*

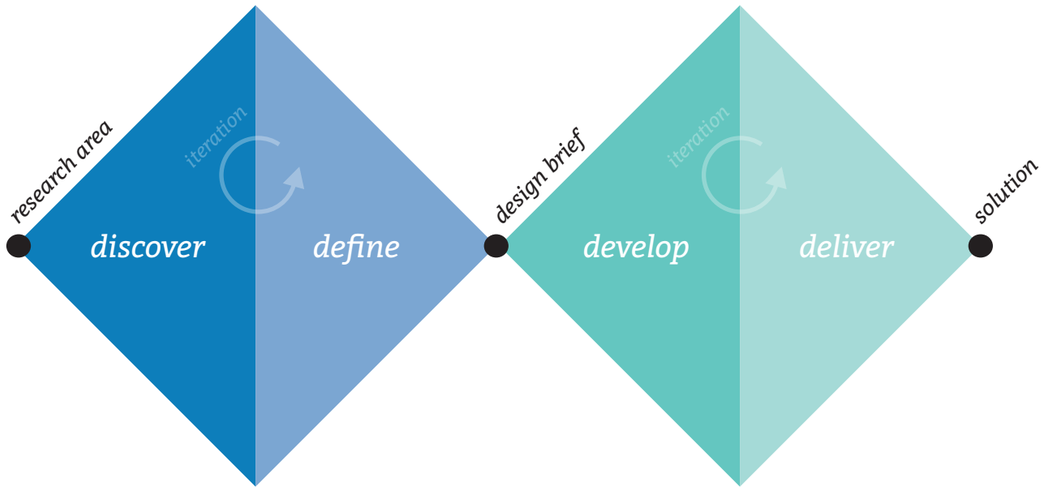



FIGURE 1
*The double diamond model (British Design Council, 2005)*

## DOUBLE DIAMOND

The double diamond, developed by the british Design Council in 2005, is commonly used to model the alternating convergent/divergent thinking patterns within the design process (British Design Council, 2005). Due to its ubiquity, it won't be thoroughly discussed here, but it should be mentioned as the model on which the design process here was based. It was used in correspondence to align project partners on project phases, and within the process itself with regard to time management and project progression choices.

One important note is that although this diagram appears linear, the design process is actually highly iterative (Stickdorn & Schneider, 2011). The design process described here, for example, moved through each phase several times.

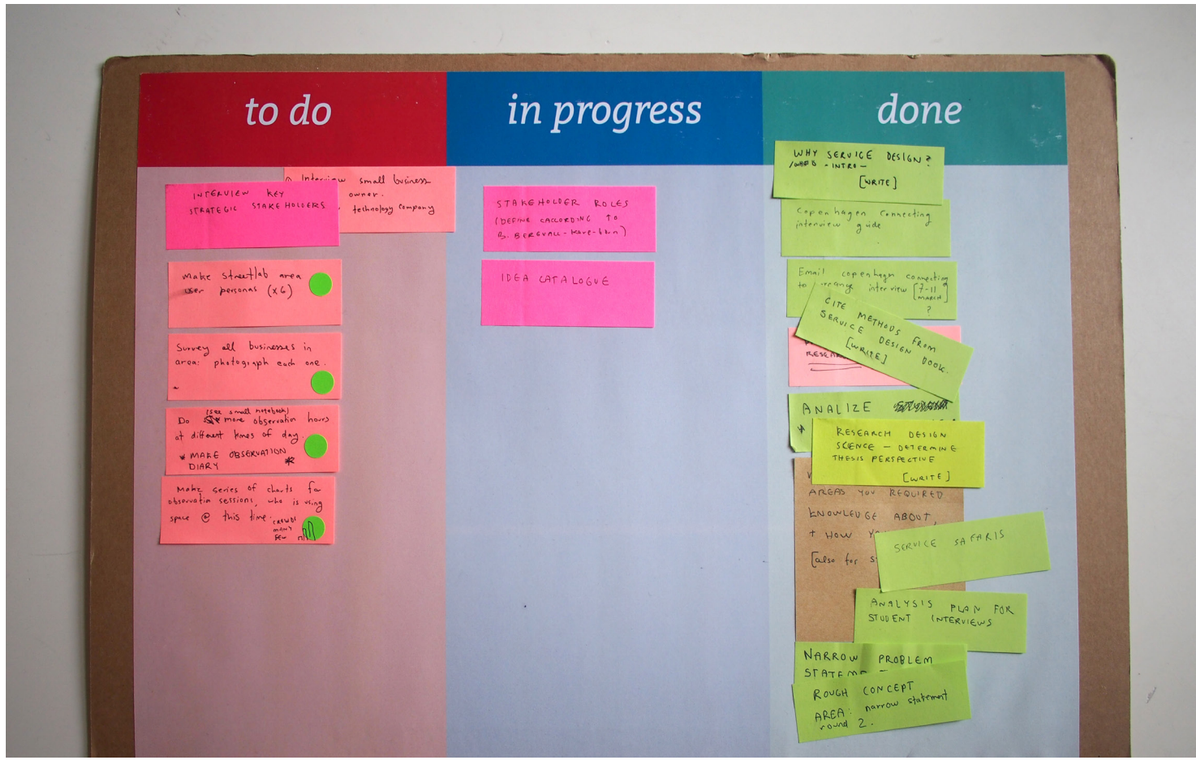


## SCRUM

To manage project progression, a heavily modified version of the Scrum framework was implemented. Scrum was developed to manage agile software development projects. It is built on the idea that often a problem cannot be fully defined at project initiation – and that requirements can change dramatically throughout project progression (Scrum Alliance, 2016). The ability to adapt to changing circumstance should be built into the project management structure. This aligns well with the design approach, which is also extremely volatile and subject to changing scope as a result of new insight.

The concepts borrowed from Scrum to guide this process were the Scrum task board, which organizes tasks and allows for good overview; sprints, in which a selection of tasks is focussed on for a short, defined period of time; and the backlog, in which tasks are accumulated until such a time as they are moved into a sprint (Scrum Alliance, 2016).

FIGURE 2
*Portable Scrum board, well-used*



# *Underlying Methodology*

*Before launching into a practical description of the design process, it is essential that an assessment of the basic underlying methodologies is performed. This is to ensure that relevant knowledge is reused and built upon where possible, established practices and protocol are followed, and paradigms that could influence interpretation are identified.*

## SERVICE DESIGN

This thesis follows some of the dominant project management, research, and design approaches within the emerging service design disciple. For the sake of clarity and alignment, 'service design' as a concept will be briefly discussed here.

Though innovation within services has arguably existed since the origin of commerce, 'service design' as a named practice came into being in the early 90's (Moritz, 2005). Since then it has grown and evolved rapidly, and as such there are a huge variety of definitions of what a 'service design approach' entails (Stickdorn & Schneider, 2011). Some common threads can be drawn, however. The first is that service design is a conceptual approach rather than an academic discipline (Stickdorn & Schneider, 2011; "Service Design", 2016). Practically, this means that emphasis is placed not on a canon of research, but on described methods of thinking (Stickdorn & Schneider, 2011) and the practicalities involved in their application.

The second commonality is the interdisciplinary nature of service design (Stickdorn & Schneider, 2011; "Service Design", 2016). This characteristic has two levels. On the first level, research and analysis tools within service design are borrowed from a wide range of external disciplines (anthropology, software engineering, etc) ("Service Design", 2016). On a second level, this trait refers to the collaborative nature of service design. Service designers must leverage competencies within a wide range of stakeholders in order to successfully work within the complex network surrounding a service offering (Stickdorn & Schneider, 2011).

Finally, service design literature agrees that a service design approach is user-centered (Stickdorn & Schneider, 2011). Through empathetic research techniques, service designers can gain deep understanding of widely disparate user realities – allowing for thoughtful design that exists successfully within these realities. A user-centered approach also functions as a common language among various stakeholders within a service design project (Stickdorn & Schneider, 2011, p. 37).

These three elements have shaped this thesis. The work presented here is largely practical, following service design's conceptual description. Though theory is of course integrated to support various decisions, the emphasis is on the decision-making process itself. In accordance with service design's interdisciplinary nature, methods borrowed from a variety of academic fields have been leveraged here – many of which have been adopted into service design practice previously. Theoretical elements are also borrowed from a multitude of disciplines, as relevant to the project. Finally, the design process described here is user-centered according to the ISO standard for human-centered design (ISO/IEC, 2010) – widely accepted as the industry definition. A full exploration of how this project qualifies as a user-centered design process can be found further in this report (see pp. 82 - 83).

## QUALITATIVE RESEARCH

Service design research can be both quantitative and qualitative in nature, but tends to fall mostly into the qualitative category (Stickdorn & Schneider, 2011). This is due to its user-centered focus: smaller scale qualitative studies allow for a deep understanding of user behavior and motivation without sacrificing the design process's ability to progress with agility and iteration (Buurman, 1997). Qualitative research stresses the "socially constructed nature of reality, the intimate relationship between the researcher and what is studied, and the situational constraints that shape inquiry" (Denzin & Lincoln, 2011, pg. 8). As such, it allows researchers a closer look at subjects' perspectives than through more removed and inferential quantitative methods (Denzin & Lincoln, 2011).

A qualitative research approach sacrifices a wide scope for intricate detail (Silverman, 2005). Detail, in this case, refers to the particular nature of research subjects' perceptions, motivations, and emotions (Silverman, 2005). In order to make sense of this wealth of detail, which is susceptible to varying interpretations, theoretical paradigms should be defined at the onset of any qualitative study (Silverman, 2005). These paradigms describe the basic set of beliefs through which research questions, methods, and the analysis of results can be organized and justified (Denzin & Lincoln, 2011). In order to provide structure, clearly state underlying assumptions, and define goals, the theoretical paradigms associated with this thesis are defined in the following two sections.

### *Action research*

The research process that follows can be categorized as action research. Briefly put, action research is a broad approach to qualitative study in which the researcher takes on a participatory role, with the aim of solving a real-world problem in collaboration with stakeholders (Reason & Bradbury, 2008). The primary purpose of action research is to "produce practical knowledge that is useful to people in the everyday conduct of their lives" (Reason & Bradbury, 2008, p. 4). According to Reason and Bradbury (2008), key elements of action research include:

- The creation of 'communicative spaces' in which dialogue is encouraged
- Gathering knowledge from a diverse range of sources both during the inquiry and afterwards while analyzing and presenting findings
- An orientation towards human-centered values
- That it is an emergent process that evolves with the understanding of those involved

An action research approach brings with it a variety of paradigms which have influenced this work, but the most notable of these here is epistemic reflexivity (Coghlan & Brannick, 2014). 'Reflexivity' in this case refers to "the constant analysis of one's own theoretical and methodological presuppositions which helps with retaining an awareness of the importance of other people's definitions and understandings of theirs" (Coghlan & Brannick, 2014, pg. 6). 'Epistemic' refers to the fact that this reflection is inward-facing – during the research process, the researcher should constantly assess their own belief system, attempting to expose their own interests and enabling the formation of an independent perspective of right versus wrong (Coghlan & Brannick, 2014). Operating within this paradigm allows researchers to follow their own, conscious assessment of the most appropriate course of action.

*In practical terms, an action research approach means that this work is pragmatic and solution-oriented in nature and collaborative and participatory where possible. It also means that the choices that led towards solution development have largely been the product of my own idea of how the world should be (based, of course, on interpreted research).*

### *Design science*

This thesis could also be described as following a design science approach (Johannesson & Perjons, 2014). Design science is the study and creation of 'artifacts' (products, services, models, plans, or concepts) as solutions to problems (Johannesson & Perjons, 2014). Though both design and design science focus on the development of novel artifacts, design science differs from the practice of design within two areas: generalization and knowledge contribution (Johannesson & Perjons, 2014). Adhering to a design science approach means that designer/researchers should keep in mind the applicability of solutions developed to other problems or problem instances, and should focus their work on contributing knowledge to global practice.

Various paradigms can be practiced within design science – sometimes even within the same study (Johannesson & Perjons, 2014). A paradigm which has been particularly influential within this study, however, is critical realism (Johannesson & Perjons, 2014). Critical realism refers to a shift on the part of the researcher towards the abductive reasoning of possible causes of observed phenomena. This paradigm encourages deep research into why and how artifacts function in their environments, including "technological as well as psychological and social factors, such as power games, resistance to change, and organisation culture" (Johannesson & Perjons, 2014, p. 174). There is an admission within critical realism that although reality exists, it can never be completely understood (Guba, 1990).

*Simply put, a design science approach here means that there has been particular focus on creating an artifact, ie. the specific solution to a specific problem. Care has been taken, however, to analyze this artifact and the process leading up to its creation in an attempt to provide a broader knowledge contribution to the service design field. Critical realism has resulted in a broad, systemic focus: as much as possible, the viewpoints of a wide range of stakeholders have been taken into consideration.*

### *A Combined Approach*

The practice of combining action research and design science has previously been described in literature. Allen et al. (2000), for example, describe a case where they used action research while designing improvements to an interorganizational information system, which allowed them to maintain focus on the 'soft' organizational aspects of system utilization. Attempts have even been made to officially merge the two theories, for example Sein et al. (2011)'s theoretical description of 'action design research'. These examples serve to confirm that logically, combining the two approaches is sound.

## VALIDITY AND RELIABILITY

Effort has been made throughout project progress to ensure the quality of research through validity and reliability (Silverman, 2005). Validity refers to the 'truth' of research findings, ie. how closely these findings represent the phenomena to which they refer (Hammersley, 1990). Both data validity and construct validity (Gorman & Clayton, 1997) are considered here. Reliability refers to the consistency of findings, ie. whether instances are categorized similarly by different observers or at different times (Hammersley, 1992).

Triangulation was employed to ensure data validity (Stake, 1995). Wherever possible, multiple sources were interviewed regarding similar issues. Where interview findings could have divergent interpretations, member checking was utilized to ensure correct interpretation. Multiple methods were also used where appropriate, for example the use of both interviews and observation to assess public space usage (Stake, 1995).

Construct validity was developed through a concrete, defined theoretical standpoint – carefully chosen to ensure that relevant phenomena do not fall outside the theoretical scope (Gorman & Clayton, 1997). See p. 33 for a discussion of the theoretical approach, design activism.

To improve reliability, member checks were employed (Stake, 1995). After interviews, summarized findings were sent back to the interviewees – allowing them the opportunity to dispute findings. The triangulation discussed above also had the effect of increasing the reliability of findings.

# *Conceptual Foundation*

*Several conceptual areas, i.e. my three interest areas, also require discussion prior to the design process description, as they underpin the thesis direction. A clear and aligned understanding of these concepts is crucial for explaining design decisions in the following sections.*

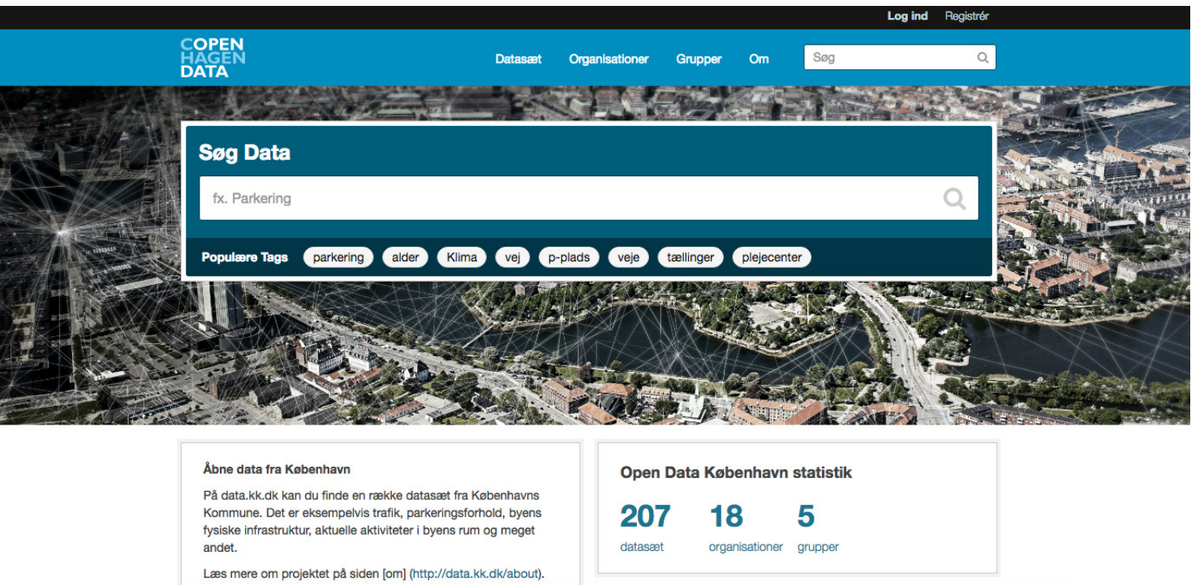
## OPEN DATA

Open data is one of the three interest areas that formed the thesis starting-point. According to Borglund (2014), the concept of 'open data' is, at its most basic level, "making public information available for others to use". Many working definitions of open data exist, but one of the most commonly cited comes from an Organisation for Economic Co-operation and Development (OECD) working paper, in which Ubaldi defines open data as:

"...data that can be freely used, re-used and distributed by anyone, only subject to (at most) the requirement that users attribute the data and that they make their work available to be shared as well (Ubaldi, 2013, p.6)"

This data can come from many sectors, including from government (Borglund, 2014). When specifically discussing 'government open data', Ubaldi (2013) has defined eight principles which can be used to assess whether or not a government data source is, in fact, open. To fit this category, the data must be: complete, primary, timely, accessible, machine-processable, non-discriminatory, non-proprietary and license-free. An additional criteria, permanence, was later defined by the Sunlight Foundation (Ubaldi, 2013).

FIGURE 3
*Homescreen screenshot from data.kk.dk*




The goals of government open data initiatives are to help citizens and the private sector understand better what exactly governing bodies do, to better hold them accountable, to help identify areas for improvement, to foster development, and to spur the development and improvement of government services (Carrasco & Sobrepere, 2015). In other words, open data should increase transparency, efficiency, and innovation.

Copenhagen Municipality hosts an open data portal at data.kk.dk/, which contains over 200 datasets from various municipal departments. Datasets are of various types, and some can be previewed directly within the site. The most popular of these are a 3D model of Copenhagen, basic maps of the city, and information on population demographics.

## SMART CITIES

The second topic underlying this thesis is that of smart cities – a widely publicized term for urban innovations which leverage technology to solve societal problems (Baccarne et al., 2014; Veeckman & Shenja, 2015). Though a strict definition remains controversial within literature, the focus within smart cities is on increasing knowledge about the urban environment through increased ICT, and increasing efficiency through this knowledge (Mosannenzadeh & Vettorato, 2014).

Smart cities have appeared in literature for decades, but there is a growing critique of the first wave of smart city discussion in relation to its strong technological-deterministic point of view (Baccarne et al., 2014). Increasingly, the conversation surrounding smart cities is turning towards collaboration: how can the complex network of stakeholders within urban environments work together to ensure that smart city innovation directly improves quality-of-life for citizens (Baccarne et al., 2014). This contemporary smart city approach looks at technology as a solution enabler, rather than an innovation driver (Paskaleva, 2011).

## INCLUSION IN URBAN DEVELOPMENT

The final interest area underlying this thesis is that of inclusion in urban development, ie. how urban stakeholders can be better integrated into the decision-making process when it comes to developing urban spaces and services. This broad topic has been discussed from many angles in literature, with the general consensus that traditional participation methods within urban planning have many weaknesses: they often only reach a very small subset of the population, there is often difficulty when it comes to translating them into actionable insights, and they are generally not prioritized highly enough (Buss et al., 2014).

This results in a situation where citizens' valuable time and place knowledge is left out from the decision making and design process, and where local urban stakeholders lack ownership of and control over projects within their area (Buss et al., 2014).

These issues are being combatted worldwide with a huge range of innovative initiatives. Even within Copenhagen, there is a growing focus on putting the citizen first with regards to urban planning (Munthe-Kaas, 2015). Even so, there is much improvement to be made in this area. (Munthe-Kaas, 2015).

# *Partnership*

*Armed with the three interest areas described above, I looked into partnership opportunities. I hoped to gain access to a real-world problem through a partnership, which could give my work relevance.*

In pursuit of potential partnerships, I approached several organizations working within my interest areas. Among these was the Copenhagen Solutions Lab, a department within Copenhagen municipality charged with innovating and developing open data; Mindlab, a governmental department charged with increasing collaboration and innovation within government; and the Danish Design Centre (referred to from here as the DDC).

All except the DDC responded that they were too busy to take on a student. The DDC responded positively, however, and I was directed towards Christian Villum as my main contact person.

## INTRODUCTION TO DDC

The DDC is an independent, government funded organization which serves as a hub for design knowledge as it relates to Danish industry (DDC (1), 2016). In their own words, the DDC's mission is "to promote the use of design in business and industry, to help professionalise the design industry and to document, promote and brand Danish design in Denmark and abroad" (DDC (1), 2016). To accomplish this, the DDC facilitates experiments with design-based value creation within companies throughout the private sector (DDC (1), 2016).

## DESIGNCITIES

The DDC organizes its work according to 'platforms': thematic areas in which they run several projects (DDC (1), 2016). Due to my interest in smart cities and inclusion, I was directed towards the 'DesignCities' (sic) platform.

The aim of this platform is to explore "how design and design methods can improve how companies, citizens and the public sector can develop and co-create cities together" (DDC (2), 2016). Within the DesignCities platform, there are 5 main focus areas:

**1. Design of better public sector purchasing and sustainable solutions**

*How can design support co-creation between businesses and the public sector, and thereby contribute to better public sector purchasing of new solutions that improves the development of the city and urban space?*

**2. New business models for city development**

*How can design create room for new business models and development of competitive solutions, when the public sector, citizens and businesses develop the city together?*

**3. Intuitive technological city solutions**

*How can design make new technological city solutions intuitive and more usable for citizens?*

**4. Fablabs as growth hubs for city development**

*Can easy access to Fablabs and new prototyping technology for businesses create city development hubs for economic and sustainable growth?*

**5. Usable open public data**

*How can design be used as a foundation for making open data in the city usable for citizens and release new potential for businesses?*

## INITIAL DIRECTION

In a kickoff discussion with the DDC, it was decided that I should focus my project on two of the focus areas within the DesignCities platform. Based on my three interest areas, the most relevant of these were deemed to be focus area 2 (new business areas for city development) and number 5 (usable public open data).

Apart from this guidance, I was not given a more specific project direction, leaving me with an extremely broad scope in which to begin problem finding. However, by combining my interests with the focus of the DesignCities project a research statement could be created:

*How might open data provide a means for the public sector, private sector, and citizens to develop urban spaces together?*

Of course, this statement is too broad be a feasible design brief, but it provided a serviceable jumping-off point as I began the design process.

FIGURE 4
*Research statement breakdown*

# PROBLEM FINDING

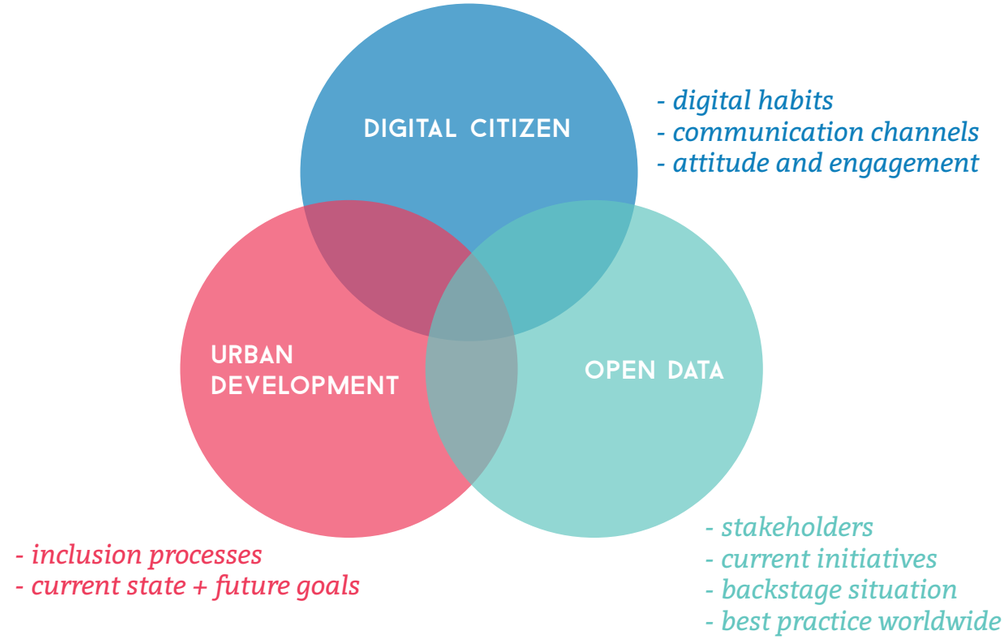
*The initial steps of the design process were based in research, as the goal was to gather enough insight to pinpoint a specific problem statement. This phase was characterized by frequent discussion with the DDC, to ensure that I was on the right track and to look for potential synergies with other projects.*

*This working style had the effect of forcing me to very quickly move through the design process in order to express potential areas for exploration – an extreme version of iteration in which the first three phases of the double diamond (see p. 3) were moved through in less than a month. This quick progression allowed the DDC to eventually identify a larger project in which to apply my thinking.*

## *Three Research Areas*

As a first step, the research statement (see p. 12) was deconstructed into three areas in which insight should be gathered (see Figure 5). From a strategic perspective, I suspected that the act of gathering even superficial information in such divergent areas would inevitably yield some more specific problem areas on which I could narrow my focus.

FIGURE 5
*Research statement further broken down into three areas in need of research. Bullets specify missing areas of information.*



# *Expert Interviews*

*As a first step, I sought expert opinions in several areas. These opinions were gathered through a semi-structured interview format (Lopez, 2008), in which I sat down with the subject for approximately one hour and both directly inquired about topics, and followed conversation flow.*

## CITIZEN INCLUSION

To gain a quick overview of how the citizen inclusion in urban planning process currently works in Copenhagen, and the directions into which it is evolving, I seeked out an expert. Peter Munthe-Kaas is currently working with Copenhagen municipality, writing his PhD on the topic, and works as a consultant and project leader in the area. Appendix A contains a transcription of this interview.

According to Munthe-Kaas, though Copenhagen municipality is actively working towards better citizen inclusion practices, much of this process is still practiced using outdated methods (such as town hall meetings, which according to Munthe-Kaas, "are rarely useful" (appendix A, highlight 1). Citizen inclusion is still often practiced "for inclusion's sake" (appendix A, highlight 2), and much of the insight is not translated into the actual planning stages. According to Munthe-Kaas, there needs to be a shift from simply wanting ideas and opinions from citizens, to the practice of gaining deep understanding from them. From there, planners can form real partnerships with citizens, eventually moving the inclusion process into the realm of co-creation.

There is a trend within Copenhagen–and planning research in general–towards more holistic thinking in terms of inclusion. More and more, businesses (especially small local businesses) are seen as an essential part of the inclusion process – a concept dubbed "playing together" (appendix A, highlight 3) with the surrounding world. Increasingly, businesses are consulted about planning projects, and public-private partnerships are formed to get concepts off the ground. Cultural events such as the popular street festival Distortion (cphdistortion.dk/) are examples of this trend.

## OPEN DATA IN CPH MUNICIPALITY

Another area where insight was needed is how Copenhagen's open data is being experimented with currently. The Copenhagen Solutions lab, who I had previously contacted when exploring partnerships, is a small governmental organization set up to do just this – to test and demonstrate the capabilities of of Copenhagen's open data. To learn more about their goals and projects, I set up an interview with them (my interviewee, Sara Hertz Gufler, requested that the interview not be recorded as our conversation touched upon projects that had not, at the time of the interview, yet been released).

The Copenhagen Solutions lab (referred to as the CSL from now on) was founded in 2014, and currently consists of nine people. Though they work in a separate office, the department is a part of the technical and environmental administration of Copenhagen Municipality. Their mandate is to explore open data as it relates to increased sustainability, new business models, job creation, and other social needs. At a basic level, they aim to improve the quality of life for Copenhageners, by following a green agenda.

To this end, they have been involved in several major projects. The first, Copenhagen Connecting, was a very broad and lofty strategy for Copenhagen's transformation into a smart city. It described an interconnected grid relaying real-time sensor information on public services (such as traffic lights and waste disposal equipment), which could be used to streamline services and create a customized and adaptable citizen experience. The CSL found these long-term future goals difficult to translate into present-day action, however, and so they have turned to a more pragmatic approach.



One of these pragmatic initiatives is the Copenhagen Street Lab. This initiative, launched in June 2016, is an 'urban laboratory' in which citizens can play with and provide feedback on various smart city solutions. Several streets in Copenhagen's core will be equipped with the sensors and infrastructure necessary to provide detailed information, which will be used by the public to create service concepts. Citizens moving through these streets will have the opportunity to interact with these service concepts, although precisely how has not been defined.

This interview also yielded some interesting insight into the internal workings of Copenhagen's open data. According to Hertz Gufler, the data on data.kk.dk is all individually prepared by the government workers who have used it. In other words, there isn't an internal governing body with oversight on all the datasets. This places much responsibility on individual government workers, which can create tension when they don't completely understand the benefit of open data.

A reluctance to put up datasets also stems from nervousness that the data will somehow be used against them by reporters or members of the public who pick out mistakes or anomalies. There is also often a sense that the required metadata often doesn't exist - for example, some of the environment-related datasets can't really be interpreted without a biology education. This problem is ongoing, but the CSL is taking steps to combat it by working as closely as possible with the rest of the Technical and Environmental administration to bring about a gradual culture change.

# *Citizen Worksheets*

I then focussed on gathering some information from a citizen perspective. As this initial research phase was geared towards a quick survey of broad key areas, an easily accessible citizen target group was selected, ie. the students and staff at various educational institutions within Copenhagen. As qualitative research expert Robert Stake (1995) puts it, "time and access to fieldwork are almost always limited... we need to pick cases which are easy to get to and hospitable to our inquiry" (Stake, 1995, p. 4). This choice of target group inevitably introduced some bias into findings, but at this early, overview-focussed phase the benefits of accessible subjects outweighed the disadvantages of bias.

I began by listing all the areas it would be useful to gain insight, a broad list which included information on citizens' digital habits, their interactions with and knowledge of open data, their interest and participation in urban development, and the communication channels they use with both government and private sector organizations. The breadth of this information deficit made it difficult to imagine a question-based interview in which I could explore all these topics, so I instead turned to a combination of methods. I grouped these in a worksheet that I could complete within 20 minutes together with my subjects (see Figure 6).

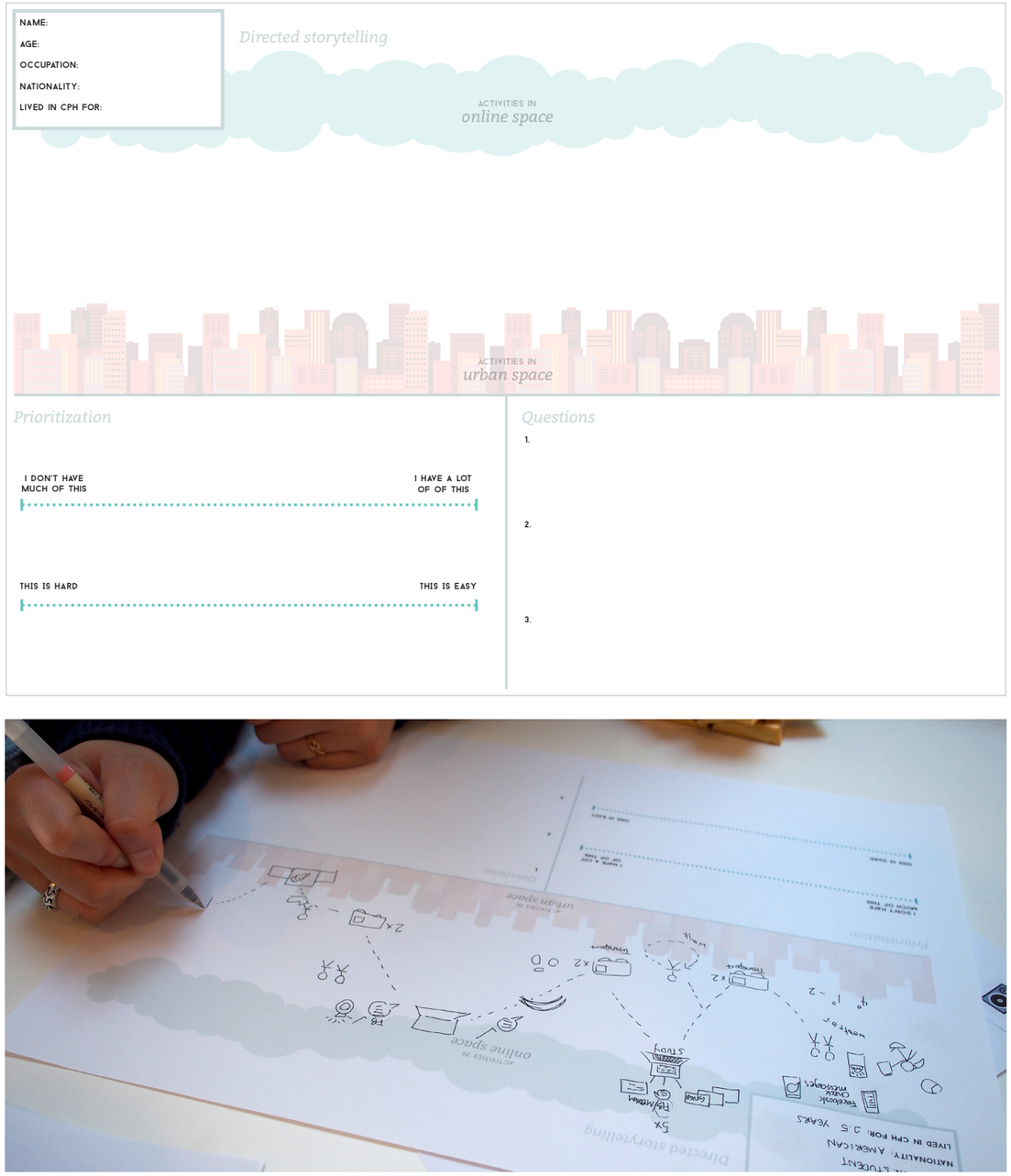
First, I used a short directed storytelling (Stickdorn & Schneider, 2011, p. 202) exercise to explore citizens communication channels and digital habits. Subjects walked through 'a typical day-in-the-life', focussing on points where they interact with a digital service, and points where they directly interact with urban space. The second worksheet exercise took a few iterations to develop, but in its final form was a prioritization exercise, during which participants were asked to rank certain statements according to two scales - allowing for an overview into their personal priorities and perceptions in a broad range of areas. The worksheet concluded with a small interview, in which participants were asked a few questions.

To gather interviews, I set up a small station in several Copenhagen universities (AAU CPH and ITU), offering students a reward (chocolate) in return for an interview. After three days of this, I had completed over 20 worksheets, with a diverse range of subjects (see appendix B).

FIGURE 6
*[below, top] Citizen research worksheet*

FIGURE 7
*[below, bottom] a citizen fills in the storytelling section*

FIGURE 8
*[right] setup at ITU*






*The worksheets contained a wealth of qualitative data, and an initial assessment revealed six notable trends and insights:*

– Almost none of the subjects were consciously using open data, and most had never heard of the concept

– Many of the participants didn't feel encouraged to get involved with municipal projects, and had no idea how one could get involved, despite having a high level of interest in how their city is developed (see Figure 10)

– Although most of the participants were interested in urban development projects, this didn't provide motivation enough to attend town hall meetings. Many subjects had had negative experiences with trying to voice their opinion about an issue in their urban environment

– Subjects remarked that although they might not feel very interested with a municipal project at first, watching it grow and develop nurtured their interest

– When asked about which kinds of initiatives should be implemented to improve Copenhagen, a majority of respondents mentioned something about more green space, and many mentioned more organized public events

– Most subjects felt like they didn't have many concrete ideas for actively improving Copenhagen, but when probed were in fact able to articulate solutions to problems in their everyday lives

– When asked about what they do to improve their city, many subjects mentioned that their daily good habits were their main contribution (ie. recycling, riding a bike, smiling, politeness, etc.)



FIGURE 9
*A citizen places a prioritization marker*

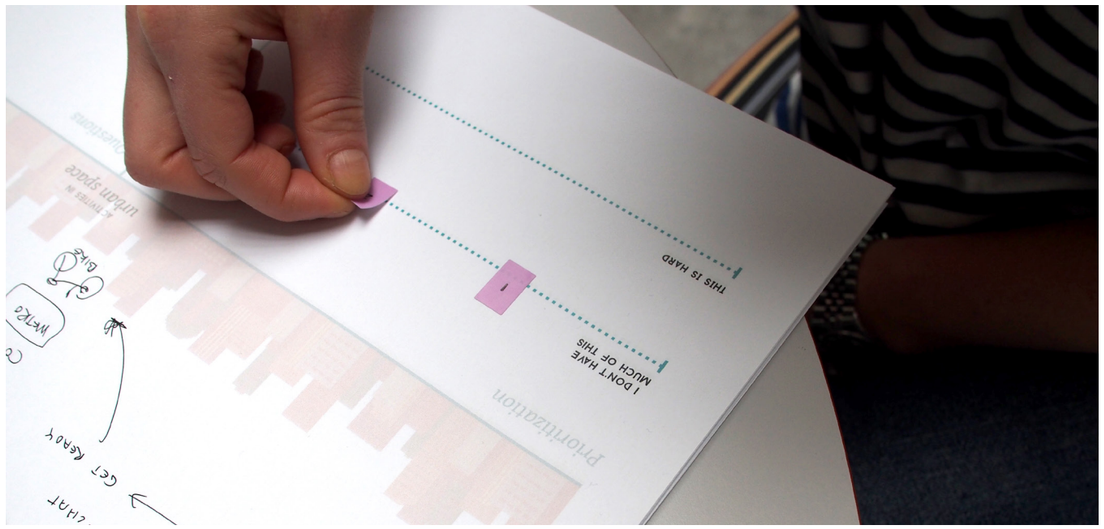
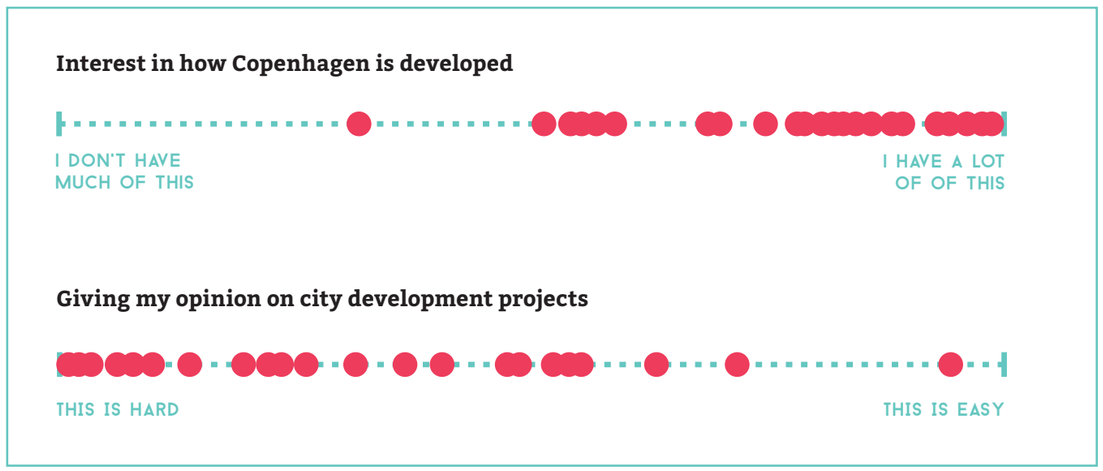


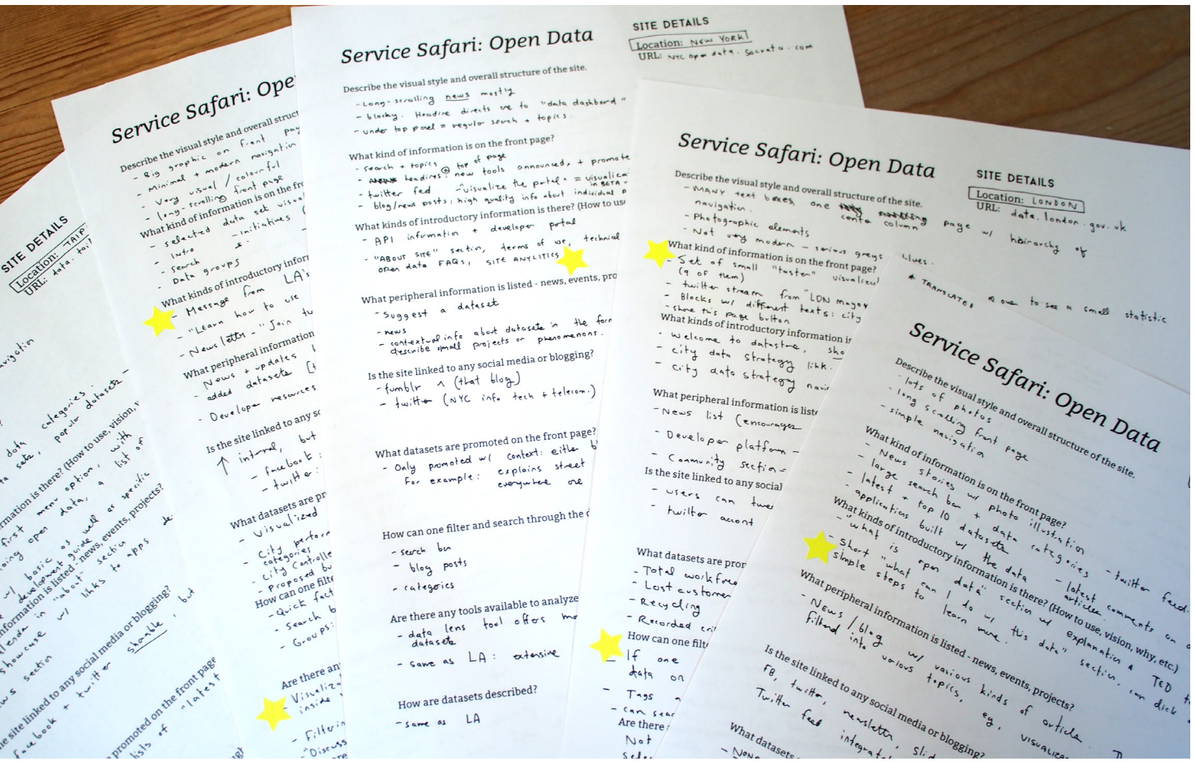

FIGURE 10
*An interesting area of tension within the results of the prioritization section. Each red dot represents one response, the location on the line where each citizen placed their marker (see Figure 9).*



# *Open Data Service Safaris*

To gain personal oversight on the state of global open data offerings, and identify best practice, I used service safaris (Stickdorn & Schneider, 2011, pp. 154-155). First, I devised a guide to help structure the safaris and make analysis easier. I then used the Global Open Data Index (index.okfn.org/) to identify 20 world-leading examples of government open data websites. Then, using the safari guide, I assessed each site's structure and content. I made a note of look and feel, promoted content, 'extras' (such as blogging, news, or forums), social media connectivity, data organization and visualization tools, and the most popular data sets (see appendix C).

FIGURE 11
*A selection of finished safaris, with notes taken on safari guides*




*An analysis of findings resulted in five notable examples and insights:*

– Most of the open data sites are very low on visualization. Some include preview tools built into their hosting platform (ex. Copenhagen's own open data portal), but these rarely function well and are often hidden within complex menus. A good example of steps taken to combat this is Paris's open data portal, which contains a map on which datasets can be layered (opendata.paris.fr/page/home/) (Figure 12).

– Many lack information for organization on how they can open up their own datasets. Amsterdam's open data portal is an exception, as they list simple steps that organizations can follow to improve their openness (data.amsterdam.nl/).

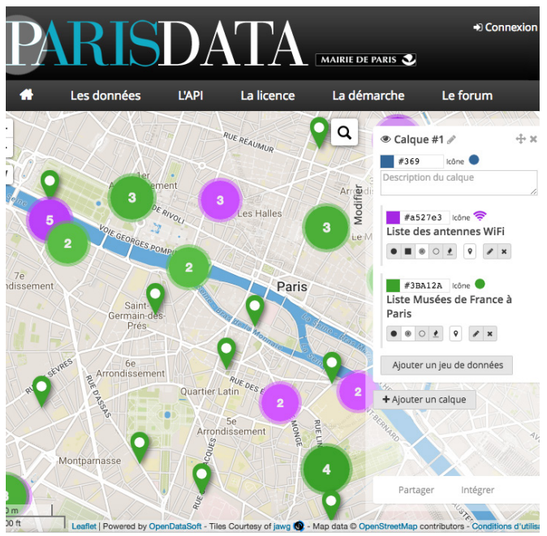
– Very few of the open data portals leave space for experimentation or testing. An exception is Ghent, which has a page listing apps in development based on their datasets (data.stad.gent/apps).

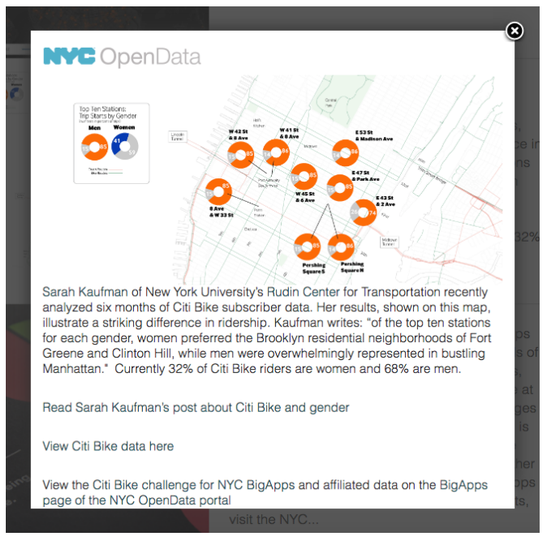
– Most of the data portals have a developer guide, instructing the technically competent on how to use datasets. Guides for citizens who are not developers were not in evidence.

– Most of the datasets were very low on context. Singapore's open data portal (data.gov.sg/) and New York's data portal (nycopendata.socrata.com/) both do a good job combatting this through investigative blog posts (Figure 13).

FIGURE 12
*[below, left] Open data Paris layerable map*

FIGURE 13
*[below, right] Open data New York blog post*



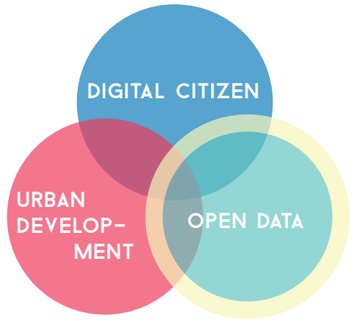



# *Define Phase: Round 1*

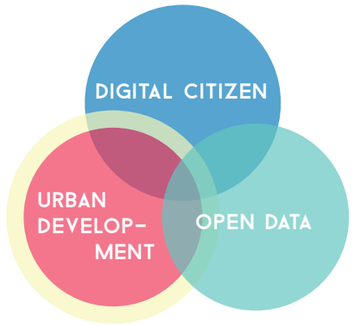
At this point in the process, each of the previously defined research areas had been cursorily examined, and in order to move forward with a concrete problem statement as quickly as possible I then moved into an iteration of definition (see Figure 14).

Insights were pulled from each research method and written on colour coded post-its, which were then used as 'game pieces' and combined to form a huge range of problem statements (see Figure 15).

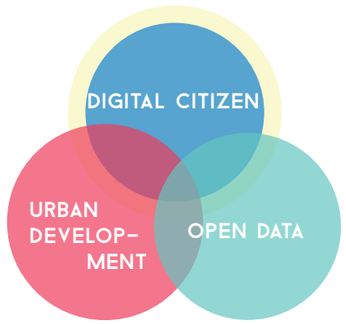
FIGURE 14
*[right] detail of the research methods used to explore each area*




*- Expert interview (CSL)*
*- Specific inquiry (citizen worksheets)*
*- Open data service safaris*




*- Expert interview (Munthe-Kaas)*
*- Prioritization (citizen worksheets)*
*- Specific inquiry (citizen workseets)*



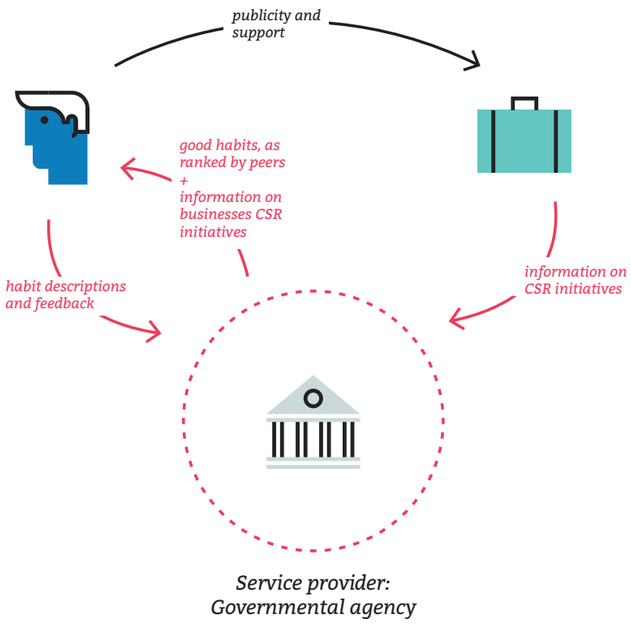

*- Directed storytelling (citizen worksheets)*
*- Specific inquiry (citizen worksheets)*

FIGURE 15
*[right] insights from each method written on colour-coded post-it notes, being used here to create problem statements*

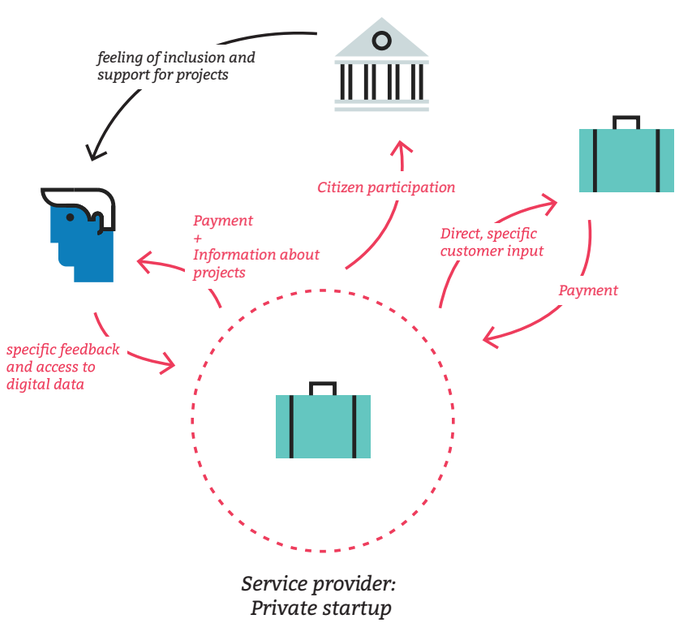
# THREE INITIAL DIRECTIONS

Based on the findings described above, three initial problem areas were isolated. In order to better communicate these directions, very rough initial value flow diagrams were created for each problem area, to demonstrate potential solution directions (see Figure 16).

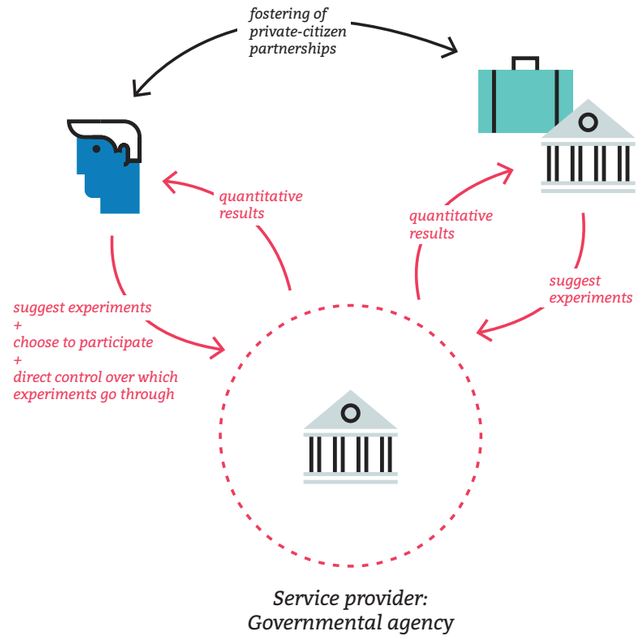
FIGURE 16
*Initial draft problem statements and corresponding rough solution architectures, demonstrated with value maps*




*1. How might we use crowdsourced open data to encourage citizens to engage in the small good habits that cumulatively improve CPH - and support businesses doing the same?*




*2. How might we make it easier for businesses and governmental organizations to gather citizen input when decision-making within an urban setting?*




*3. How might we make it easier for urban stakeholders to engage in quantifiable experimentation?*

# *Feedback & Change of Focus*

I then presented my three directions to the DDC, with the goal of collaborating with them in the selection of the most promising problem area. Instead, however, they suggested that all three directions were interesting and viable - but to make the solution more practical I should look into applying it in another project they were currently involved in: the CSL's Street Lab.

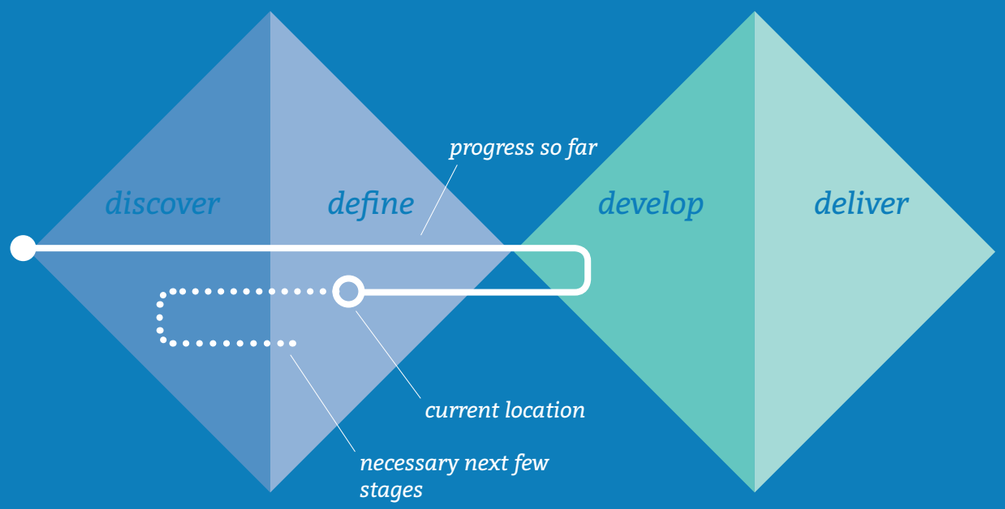
This suggestion proved to be a pivotal moment in project progression. Relying on the DDC's network, I began to explore the Street Lab project in more detail, and in so doing uncovered a very concrete problem statement.

One important note is that although the the project turned away from the solution directions described in the previous section, these steps were essential both in building a solid foundation of understanding, in gaining access to Street Lab, and as context for solution development.

# BUILDING A SOLUTION

*At this point in the project process, I had a solid foundation of initial research, some rough problem areas and concept directions, and had been prompted to look into the CSL's Street Lab project. This next report section details the precise problem I set out to solve, and the steps I took to build a solution.*

*The diagram below shows project progress so far in relation to the double diamond model (p. 3).*




## *What is Street Lab?*

*To find out more about Street Lab, I had a discussion with Sune Fredskild, co-manager of the project. A contextual interview format was used (Stickdorn & Schneider, 2011, p. 162), as this technique can sometimes provide greater detail and specificity. We moved throughout the physical Street Lab space as we talked. The active nature of the interview format prevented me from recording it, but relevant findings are summarized here.*

Street Lab is an urban living lab project within Copenhagen. It has been organized by the CSL in collaboration with tech companies Cisco, Citelum and TDC, and is scoped to last two years. A public-private innovation partnership underlies the project, with all stakeholders providing capital in the hopes that profitable future technologies will be developed here. An overview of stakeholder participation can be found on the following page (Figures 17 & 18).

The focus in Street Lab in general seems to be on government-private sector partnerships, and on the technical development of smart city solutions. Fredskild stressed that, above all, the goal of the CSL in general was to develop Copenhagen technically as a smart city.

Street Lab is will be a testing ground for new technologies that improve the efficiency, environmental impact, and convenience of life in Copenhagen, ie. smart city technology. Infrastructure has been established (wifi and wide area networks such as LoRa) to support these tests.

Six kick-off projects have been selected as the first wave to be tested in the area: a smart parking system, an air quality sensor, a smart waste monitoring system, and intelligent plant management system, a UV sensor, and wifi for tourists. The smart parking system is citizen facing, with an already-developed interface. The waste management and intelligent plant management systems are municipality facing, with interfaces designed for the operators of city maintenance services. The air quality and UV sensors are simply being tested as sensors - though plans to develop interfaces are in the works, neither have been developed. The wifi is of course simply a service in itself. Data produced by the sensors is planned to be uploaded to opendata.kk.dk, though technical system is not yet advanced enough to do this in real time.

The project is still in its initial phase, so much of the protocol surrounding how it will operate are still to be defined. Two major areas for further definition remain:

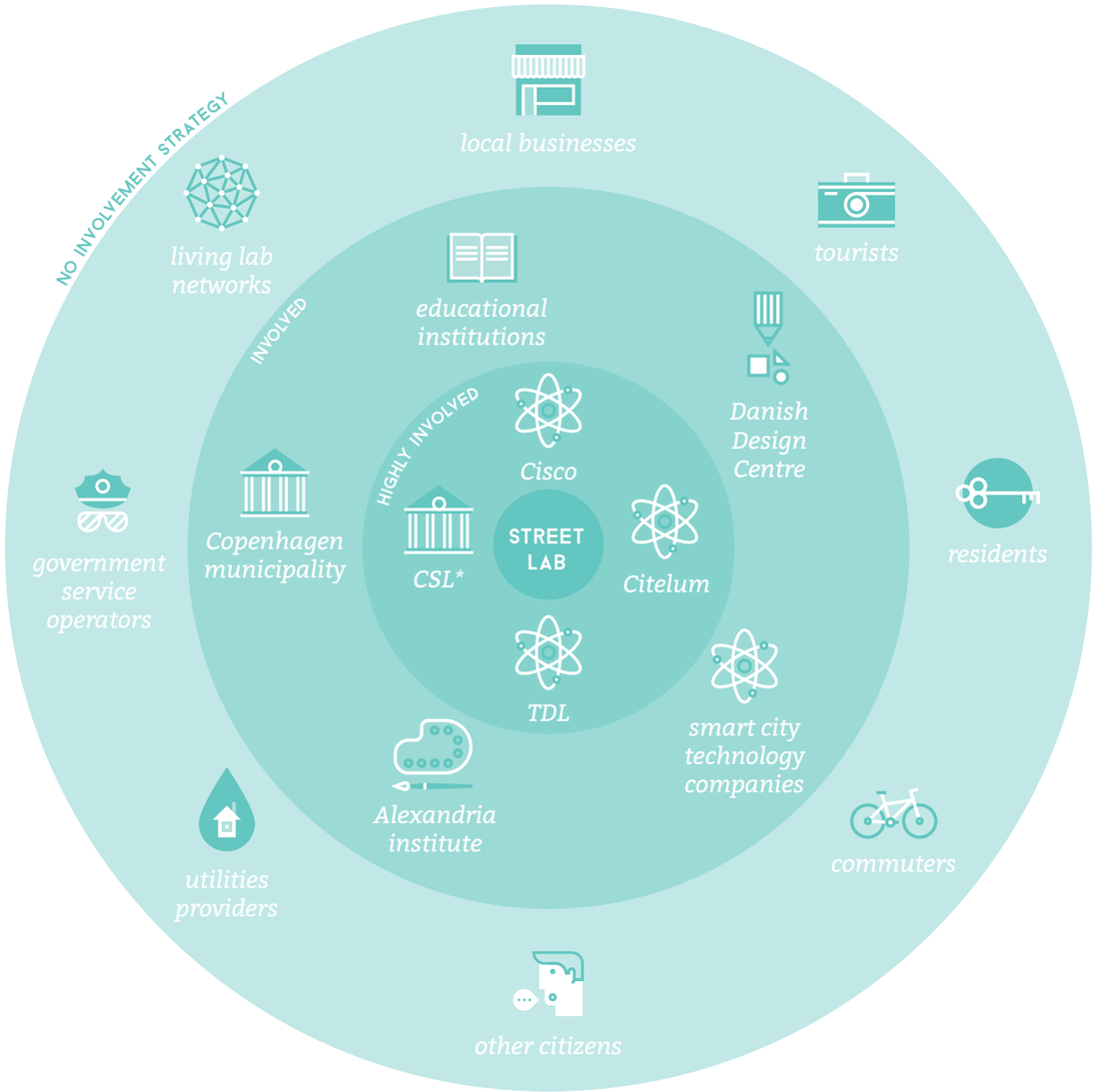
1. **How should new solutions to be tested in the lab be selected/implemented/assessed?**
2. **How should more diverse urban stakeholders (such as passing citizens, small businesses, and the non-tech private sector) be involved in Street Lab?**

The DDC is currently involved with answering question 1. Together with CSL, they are developing a system through which businesses can apply to have their products and services tested in the lab. Several workshops have been conducted with the initial six tech companies, and a design agency will be contracted to create the final service. This will most likely be a web portal on the CSL website.

Very little work, however, has gone into answering the second question. Because the Street Lab is still in its infancy, stakeholder involvement has primarily focussed on the technology companies looking to test their wares in the lab. More diverse stakeholder involvement has, for the most part, been relegated to later project stages.

Fredskild stressed during our interview that the CSL did not have time to work with me on developing any solutions – they were already stretched to capacity and focussed on other tasks. Any work I did in this area would have to be entirely independent.

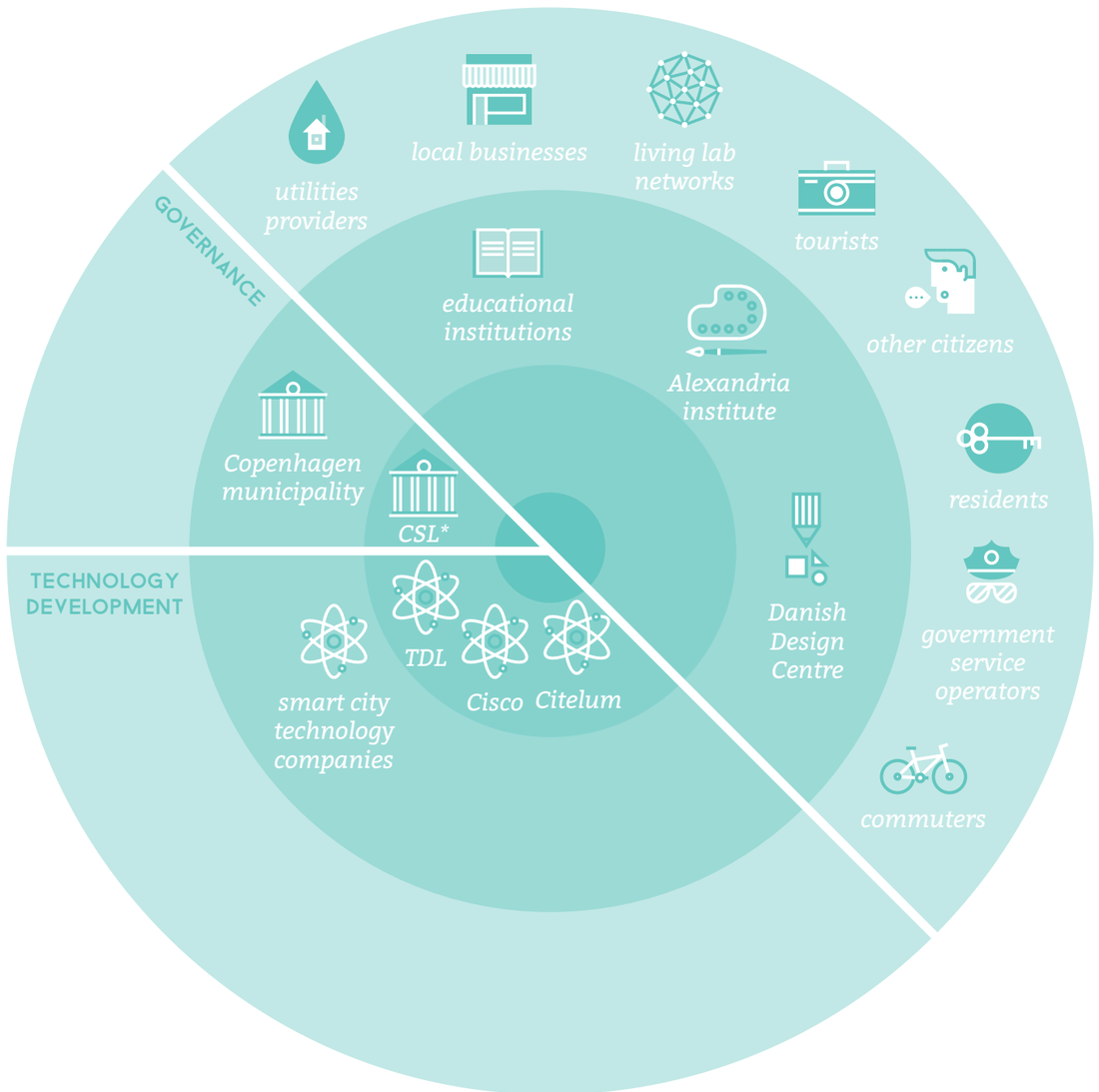
FIGURE 17
*A map of stakeholders curently involved or impacted by the Street Lab project, organised by level of project involvement*




* although part of CPH municipality, CSL has been separated due to differing levels of motivation, control, and involvement



FIGURE 18
*The stakeholder map divided by current roles. Evidently, the majority of urban stakeholders are currently not involved within any major capacity*



# *Urban Living Labs*

The 'living lab' concept on which Street Lab is modelled is well described in literature. Living labs are localized areas of experimentation within urban environments in which stakeholders can collaboratively and iteratively develop new, technology-enabled urban solutions. Within an urban living lab citizens, businesses and government can come together within a real-life environment, over an extended period of time, to exchange knowledge and build ideas (Niitamo & Kulkki, 2006; Paskaleva, 2011; Schuurman et al., 2012). Innovations developed, tested, and iterated within a living lab should have the potential to be applied more broadly, across the urban landscape (Baccarne et al., 2014). According to the European Network of Living Labs, an international benchmarking federation that keeps track of living labs around the world, all living labs incorporate five key elements (ENoLL, 2016):

**Active user involvement:** *giving end users the power to impact the design process*

**Real-life setting:** *the provision of a development and testing ecosystem within a functioning, complex urban environment*

**Multi-stakeholder participation:** *involving a wide range of stakeholders – from technology providers, to governing bodies, to end users*

**A multi-method approach:** *combining a wide range of tools borrowed diverse academic and economic fields*

**Co-creation:** *an iterative design process with multiple stakeholder groups*

Living labs are considered best practice when it comes to collaboratively developing new smart city solutions (Baccarne et al., 2014). Citizens have, within the last decade, experienced radical empowerment accompanying the internet-led democratization of knowledge, and gained access to massive new communication platforms (Castells, 2012). This has resulted in a proliferation of bottom-up urban innovation initiatives (Foth, 2009). Citizen-led and decentralized, these initiatives are often beyond the governance of traditional government (de Lange & de Waal, 2013).

The result of this is some tension with the traditional, top-down approach to urban innovation. One of the frameworks being used to combat this tension is the living lab (Almirall, 2008). Within the controlled environment of a living lab, it is possible to keep "users continuously involved in making better products and services while their expectations are continuously monitored and reflected upon in a systematic process" (Paskaleva, 2011, p. 157) – a reconciliation of the energy and inclusiveness of citizen-led initiatives with the methodological and controlled approach of top-down urban innovation.

## BENEFITS OF DIVERSITY

The meaningful inclusion of a diverse range of urban stakeholders is widely perceived as essential for the development of useful urban technological solutions (Baccarne et al., 2014, Eskelinen et al., 2015, Bergvall-Kareborn et al., 2015, among many others). By including stakeholders outside of the IT industry in solution development, products and services can be made relevant for diverse urban demographics, and can find improved acceptance and greater ownership among end users (Eskelinen et al., 2015). Economic solution sustainability, a major challenge for many smart city solutions – can be greatly improved by ensuring that the social dimension and supporting context are focussed on as much as the technology itself (Baccarne et al., 2014).

Additionally, including diverse stakeholders helps to educate them on the technology being implemented in their living spaces, and allows them to take fuller advantage of this technology, as well as to maintain better control over their data and privacy (Nam & Pardo, 2011). It also ensures that the smart city vision develops according to a user perspective, and not just according to the goals of large IT infrastructure corporations (Tomas et al., 2016).



# *Revised Project Goal*

At this point, a concrete problem statement finally became clear. My previous, problem-finding research had shown that many Copenhagen citizens have no idea about open data or smart cities or how they might get involved with developing their own city – although there is a high level of interest in this area. Street Lab, as an urban living lab, provides an excellent opportunity to help remedy this by bringing these abstract concepts into the real world. Unfortunately, this opportunity has so far not been prioritized.

Furthermore, Street Lab as it is currently described does not even fulfill the criteria for classification as a living lab (described on the previous page) – which is problematic as the project is described as such. Though the project is indeed situated in a real life setting, and several stakeholders are involved, there is no evidence of co-creation or a multi-method approach, and active user involvement is left up to the technology companies testing their products in the area.

## FINAL PROBLEM STATEMENT

The following problem statement was therefore developed:

> ***How might we broaden the focus of Copenhagen Street Lab to incorporate educating and including diverse urban stakeholders in smart city development while developing new technologies.***

# DESIGN ACTIVISM

Given the practical, real-world nature of the problem statement above, it was imperative that the designed solution had the best possible chance of spurring real change. An important note is that the focus of this statement is to "broaden the focus of Copenhagen Street Lab": the real goal, therefore, is to change perceptions within CSL, and consequently shift their priorities.

This posed a conceptual challenge. The service design approach is, of course, used most often to develop or improve services: practical solutions to external problems. Leveraging the same approach with the goal of altering perception required a different mindset. I searched, therefore, for a cohesive, theoretically-described perspective, to give focus and direction to the design process – and found one in design activism.

In the words of Alastair Fuad-Luke, in his influential work *Design Activism: Beautiful Strangeness for a Sustainable World* (2009), design activism is:

"design thinking, imagination and practice applied knowingly or unknowingly to create a counter-narrative aimed at generating and balancing positive social, institutional, environmental and/or economic change" (p. 27)

More specifically, design activism is the discussion and practice of design's role in three areas: promoting social change, raising awareness, and questioning the status quo (Markussen, 2013). Design activism hinges on the introduction of heterogeneous material objects and artifacts, which, as they invite interaction and reflection, change common perceptions of a situation (Markussen, 2013). In a manner similar to art activism, the purpose of design activism is to "open up the relation between people's behavior and emotions" (Markussen, 2013, pg. 39), creating room for renegotiation. Markussen dubs this effect "disruptive aesthetics" (2013).

Design activism is most often practiced as a form of social innovation, whereby the for the motivation for the activism is to inspire change that meets a relevant social need (Mulgan et al., 2007). Within this extremely broad field, it is one of a huge range of methods all with the ultimate goal of tackling difficult global problems by implanting ideas (Mulgan et al., 2007).

A common theoretical framework for categorizing design activism is still under development, but Markussen (2013) discusses several possibilities, including an artifact-based system (described first by Ann Thorpe). This system breaks design activism into six categories:

1. **A demonstration artifact:** *reveals positive alternatives superior to the status quo*

2. **An act of communication:** *making information visual, devising rating systems, creating maps and symbols, etc.*

3. **Conventional actions:** *proposing legislation, writing polemics, and testifying at political meetings*

4. **A service artifact:** *providing humanitarian aid for a needy group or population*

5. **Events:** *conferences, talks, installations, or exhibitions*

6. **A protest artifact:** *deliberately confronts the reality of an unjust situation in order to raise critical reflection on the morality of the status quo*

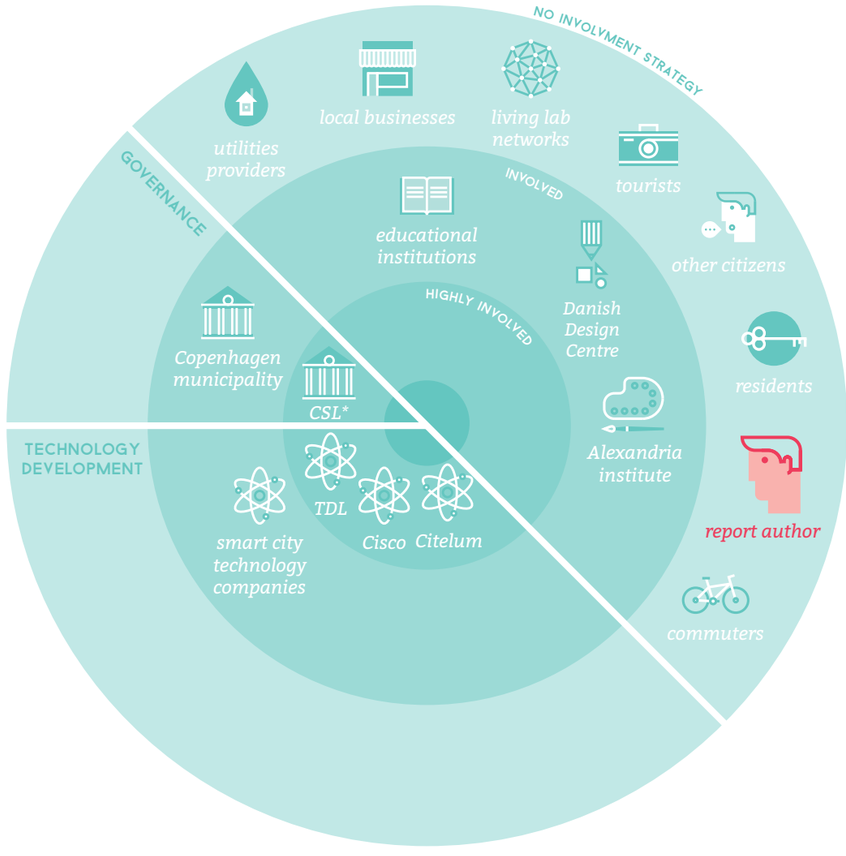
(Markussen, 2013, pg. 40).

Markussen dismisses this framework as too neglectful of the purpose of the specific act of design activism and exclusionary of the tools and methods that make up the practice of design, and points out that often design activism projects fall into several of the categories. Nevertheless, this framework does create a basic, concrete foundation on which to anchor discussion–and will therefore be useful here to roughly categorize the design artifacts created.

To grasp why design activism is an appropriate perspective, it is useful to go back to the stakeholder diagram presented first on page 29 (see Figure 19). Marked in red is the thesis author, outside the ring of involvement, and certainly outside the area of project governance. It is therefore impossible for this work to directly influence the goals, processes and activities within Street Lab – instead, the project goal should be to influence governance-providing stakeholders.

*Ultimately, the practical result of this approach is that although the needs and wants of actual Street Lab users are extremely important, paramount to this is creating artifacts which speak to accessible governing stakeholders (ie. Copenhagen Solutions lab) in an inspiring and influential way.*

FIGURE 19
*My own location on the stakeholder map – well outside of the governance and development sections*



# *Activism Strategy*

Tackling the above problem statement from a design activism perspective has specific, practical implications. As the goal is to guide Street Lab governance towards a more inclusive mindset, artifacts should be created and introduced strategically, so as to inspire and teach but not overwhelm or condescend. Artifacts should be compelling to look at and easy to share, and communicate complex ideas clearly.

With these thoughts in mind, I determined that a series of artifacts, each building upon the other, might be the best approach. Each artifact should pique interest to a high enough degree that the introduction of a more complex, disruptive artifact became acceptable.

As a first step, a draft 'artifact strategy' was devised, with the stipulation that it could be iterated as necessary in accordance with feedback (Figure 20). The draft plan included three initial artifacts, based on Markussen's previously described framework. The introduction of each new artifact was contingent on the success of the previous artifact. As a final step, the draft plan included an assessment as to whether more artifacts were needed. The first three planned artifacts are described in more detail here:

**Artifact 1:** *an act of communication*

**What:** An initial issue that came up in research was a lack of oversight over what other living labs are doing with regard to diverse stakeholder inclusion. As an initial deliverable, I planned to investigate this topic and present my findings back to both groups in an organized, engaging format.

**Why:** Knowledge reuse is an essential tenement within living lab literature (Baccarne et al., 2014) – and one that is often neglected (Baccarne et al., 2014 [2]). By investigating what others are doing, we can ensure that we can build upon their successes and learn from their failures, moving living lab knowledge forward.

**Goals:** With this first artifact, I hoped to accomplish two things. Firstly, I hoped to provide some accessible information on this topic, to be used in project planning and development. Secondly, I hoped to lay the groundwork, with regard to trust and approach, for further deliverables.

**Artifact 2:** *a demonstration artifact*

**What:** As a second deliverable, I planned to describe my own ideas for how Sreet Lab could include more diverse urban stakeholders. Idea generation should be based both on previous research and new user research in the Street Lab area.

**Why:** A service design approach is pragmatic and solution-oriented, and it therefore made sense to express some potential solution components early in the design activism process. By introducing my own ideas about potential futures for Street Lab, I hoped to steer the conversation towards solution finding. Though I hoped my own ideas might be valuable in their own right, the greater goal was to spark practical contemplation and conversation about what kinds of initiatives could realistically be valuable and feasible.

**Goals:** I hoped to garner enough interest with this artifact to move on to more open, discussion-based solution development. I also hoped to provide some useful and accessible ideas, and to demonstrate some user research techniques.

**Artifact 3:** *an event*

**What:** I then planned to hold a workshop in which practical initiative ideas are discussed. Ideally, participants should come from both the Danish Design Centre and the CSL.

**Why:** As mentioned, the practical nature of the problem requires practical, realistic solution development. In order to ensure this, active stakeholders should be involved as much and as intimately as possible.

**Goals:** I hoped with this workshop to move past my own ideas (presented within the demonstration artifact) and on to practical, workable solutions based on the input from workshop participants. I hoped to end the workshop by defining a series of practical 'next steps', both from my perspective and from the perspective of the other participants.

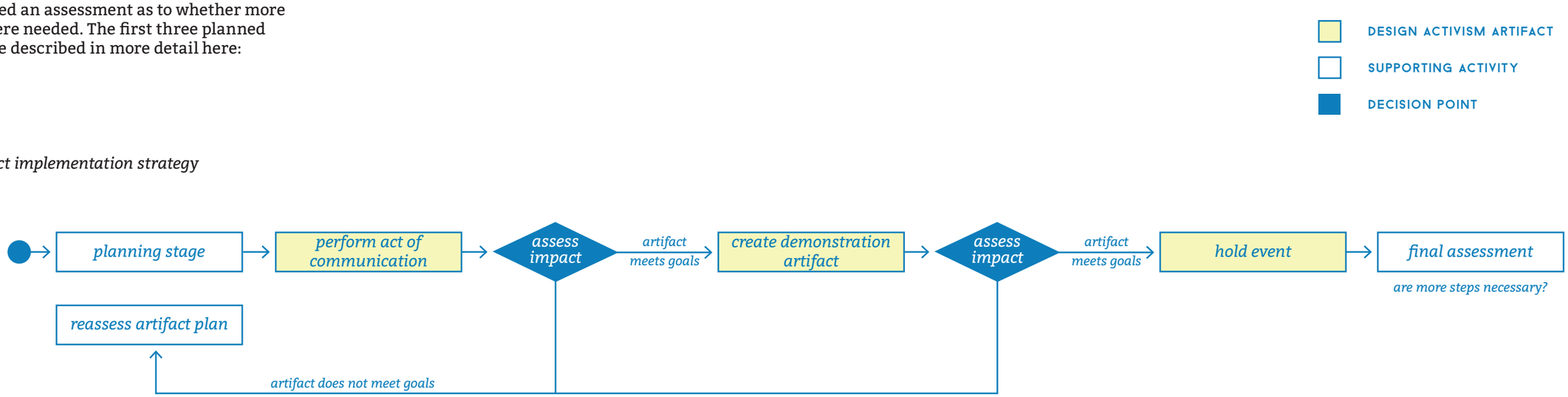



FIGURE 20
*Draft artifact implementation strategy*

# *Benchmarking*

As previously described, the first artifact of design activism was an act of communication (Markussen, 2013). In order to begin devising a plan for including more diverse stakeholders in Street Lab, I first needed to gain a solid grasp of how others were tackling this problem. This information should then be presented back to the Street Lab organizers in a simple and compelling format.

There were two steps involved in this analysis. First, an overview of literature revealed that diverse stakeholder inclusion practices can be roughly categorized into seven major method areas. Within each method area, there are a large variety of specific applications possible – some already tested and described, others tested but not thoroughly described, and others yet to be specified and implemented. The method areas I determined are:

**1. Facilitated DIY**: *assisting stakeholders with their own projects*

**2. Community Building:** *creating a space where stakeholders can learn and come together*

**3. Panel Integration:** *heavily involving a specific group of stakeholders in governance*

**4. Sustained Co-Creation:** *building solutions with stakeholders involved in each stage*

**5. Crowdsourced Ideation:** *open, often web-based solicitation of ideas*

**6. Citizen Science:** *distributed data collection*

**7. Hackathons:** *time-limited problem-solving events, usually group based*

I ranked these method areas according to the following matrix (Figure 22), distinguishing them by target group and by intended goal.

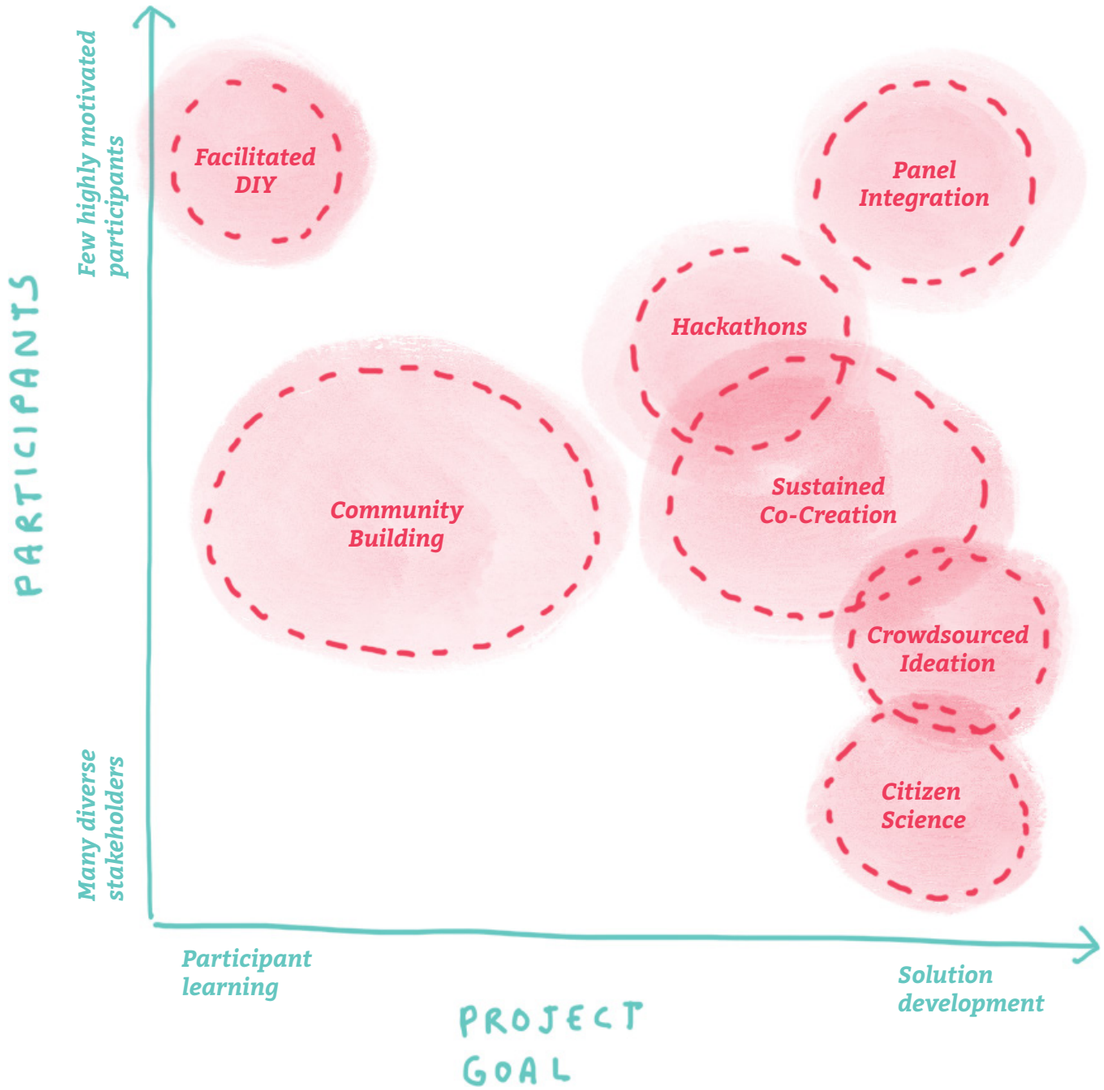
The second phase of the analysis involved selecting and describing an example case for each method area. These examples will be summarised on the following pages.

It is important to note that this analysis is based on the findings and opinions of other researchers, and as such is coloured by their biases – as well as the subjective opinion of the author. Additionally, availability of in-depth information, in English, on specific living lab instances was limited, and therefore this assessment is biased according to living labs on which sufficient information was available.

The best practice analysis was collected in a visual report, and presented to the Street Lab organizers as both a digital and printed booklet (Figure 21). See appendix D for the full document.


FIGURE 21
*[left] The printed deliverable*

FIGURE 22
*[below] Inclusion method categorization matrix*



## NOTABLE CASES

*The following projects exemplify the method areas I identified as currently being explored to include more diverse stakeholders within urban technology development.*

*For much more detail see appendix D.*

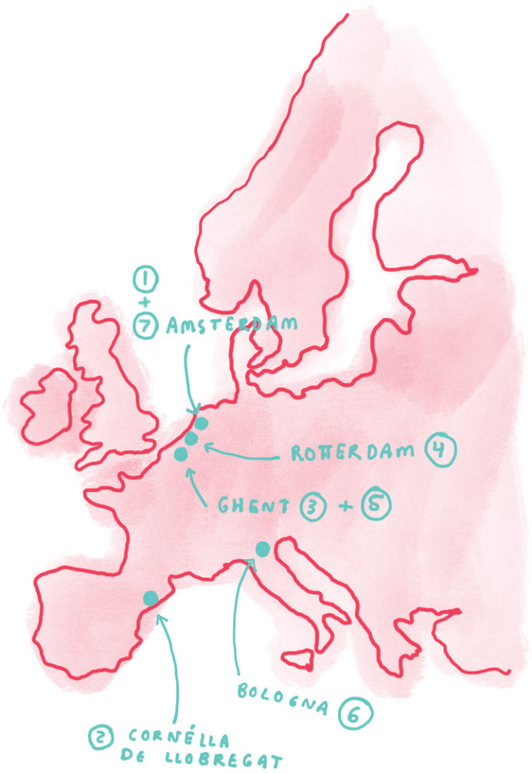



FIGURE 23
*Map of the example cases numbered according to the method area they exemplify*

### 1. FACILITATED DIY
= *Amsterdam Smart Citizens Lab*

A public course during which groups of citizens could develop their smart city technology ideas, supported by professionals, over several months.

The course consisted of workshops, lectures, and an open-door supported working area.

*waag.org/en/project/amsterdam-smart-citizens-lab*

### 2. COMMUNITY BUILDING
= *Cornella de Llobregat Citilab*

This suburb of Barcelona has created a 'smart citizen centre', a physical space in which citizens can experiment with technology, take classes, and participate in events.

A free introductory course is offered for all citizens of the area, and specific 'labs' target harder-to-reach demographics.

*citilab.eu/en*

### 3. PANEL INTEGRATION
= *Future Legends Ghent*

A panel of teens was recruited to assist the city of Ghent with developing new media for younger, marginalized citizens. The teens provided input at various stages during the process, and the final, successful outcome of the process is a self-sufficient and popular website on which teens can promote their own content as well as exploring local artists.

*biblio.ugent.be/publication/4083727*

### 4. SUSTAINED CO-CREATION
= *Emerging Media Rotterdam*

Students were grouped with professionals from various fields and the groups were tasked with finding new uses for a variety of open data sets. The several-month long project resulted in several new services – some of which are being developed now for public release.

*timreview.ca/article/607*

### 5. CROWDSOURCING: IDEATION
= *My Digital Idea for Ghent*

This simple crowdsourcing project consisted of web-portal through which citizens could post ideas related to "how might ICT improve everyday life in the city", vote on their favorite ideas, and provide comments. The site gained relative popularity, with 5,500 unique visits and 128 ideas generated.

*scielo.cl/pdf/jtaer/v7n3/art06.pdf*

### 6. CITIZEN SCIENCE
= *Participact Bologna*

This experimental program provided students and staff at the University of Bologna with smartphones, and used these devices to gather data on the local area, both through passive tracking and active, location-based tasks. Though not a publically released initiative, this program made strides in building up backend functionality.

*participact.ing.unibo.it/infoen/*

### 7. HACKATHONS
= *Appsterdam Amsterdam*

A 48-hour, public, annual event during which participants form groups and develop apps for the city of Amsterdam, based on a selection of open datasets. Several successful applications have been developed as a result of the hackathon.

*appsterdam.rs/*

## IMPACT

The best practice report was well received. Christian from the DDC wrote that the document was a "highly interesting read", and suggested that the information be used to "initiate a discussion [with the CSL] of how it could feed into current processes".

This positive reception allowed me to go ahead with the strategy outlined on pp. 35 - 36 – and to move the research process into the real world in anticipation of coming up with solutions.

# *Real-World Research*

*I then began to gather some first-hand data about the specific Street Lab area, with the goal of collecting insight enough to provide a solid foundation for ideation.*

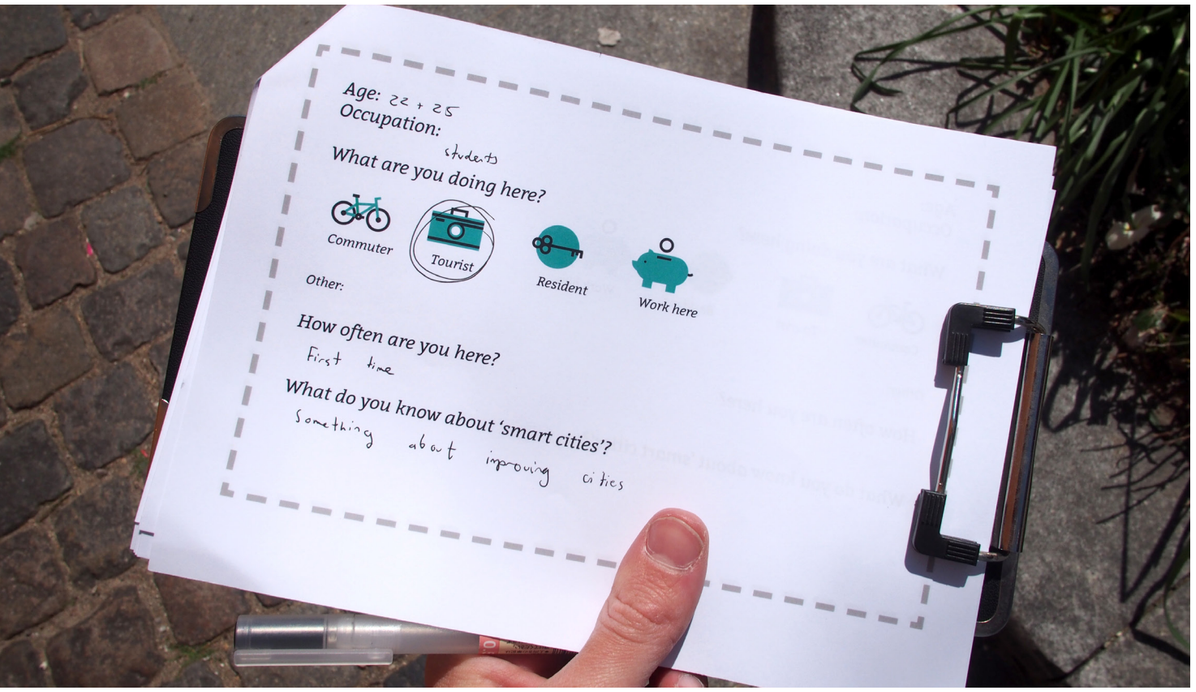
I aimed to find out more about the physical Street Lab location, and the kinds of people who use the area and why. The primary methods used here were observations, shadowing, and brief interviews.

I held six observation sessions in the Street Lab area: a weekday morning, afternoon, and evening, a weekend afternoon, a weekend evening, and a public holiday. During each session, I moved from Rådhusplads to Vester Voldgade, and then back along H. C. Andersens Boulevard, noting the types of people I saw and their activities. I traced the paths of various people in the area, noting precisely how they moved through the area. I also briefly interviewed people within the area, asking them why they were there, how often they were there, some personal details, and assessing their level of knowledge about Street Lab, smart cities, and open data (Figure 24). A diary of these interviews and observations can be found in appendix E.

My overall findings pointed to the obvious: this is an extremely diverse area. Usage varies greatly depending on the time of day, and many different types of people use the area. There are several major attractions within the street lab area, as due to this there is a heavy tourist population. On weekday mornings and afternoons, there is a rush of commuters through the area – both on bicycle and on foot. Small businesses line Vester Voldgade, including a variety of cafes and restaurants.

FIGURE 24
*[below] Interview template with results*

FIGURE 25
*[right] Rådhuspladsen at mid-day. Tourists, commuters, and an event all share space.*




# OBSERVED ACTORS

To synthesise the detailed qualitative information gathered in the Street Lab area into a more workable format, rough basic role personas were created. Shown here are the most common actors currently engaging with the area, the times they can most often be found here, and a very short description.

The personas are split according to perceived motivation. For example, ‘protestors’ are separate from ‘event-goers’, even though technically both are attending events, due to highly divergent reasons for attendance.

The green icons [listed right, top] show the times when these role personas most frequently use the Street Lab area

*Mornings*

*Daytime*

*Afternoons*

*Evening/night*

WD *Weekdays*

WE *Weekends*

SE *Special events*

WD
WE

***Residents***

This is a somewhat affluent neighborhood, with varied residents

WD

***Schoolkids***

There is a school and several daycares in this area

WD

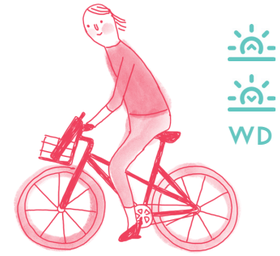
***Business Owners***

Small and medium-sized businesses line the streets in the area

WE
WD

***Marginalized People***

Displaced or otherwise struggling citizens can also be found here



WD

***Commuters***

Move en mass through the area by bike, foot or car twice a day

SE

***Event-goers***

CPH residents attend various kinds of events at Rådhusplads

WD

***Municipal Workers***

Work throughout the area in maintenance and other areas

SE

***Protestors***

Rådhusplads hosts most of CPH’s protests, due to proximity to City hall

WE

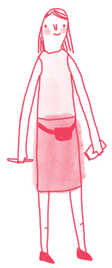
***Shoppers***

The area backs onto CPH’s busiest shopping streets

WD
WE
SE

***Tourists***

This area hosts several major tourist destinations



WD

***Workers***

A huge variety of citizens work in diverse positions in this area

# *Solution Roadmap*

Based on the interviews, observations, best practice analysis, and my previous problem-finding research I created an initial solution roadmap. The idea behind this document was to outline my own opinion of an appropriate series of next steps, with the goal of spurring conversation with the DDC and CSL, and hopefully gaining support enough to begin discussion with them on possible next steps. In other words, the goal was to create a selection of sacrificial concepts (Mikael, 2008), which could be used to build finalized solutions.

The solution roadmap was designed to function as a demonstration artifact (Markussen, 2013) – demonstrating an alternate view of what Street Lab could be. By showing the governing actors of Street Lab another version of the project, perceptions could hopefully be stretched and challenged.

The solution roadmap ideas and structure will be summarized on the following pages. For the full document, see appendix F.

## THREE STAGES OF INVOLVEMENT

The ideas presented in the solution roadmap were sorted according to three major categories, aligned to a simple framework I developed to describe the three major levels of diverse stakeholder engagement. These are:

1. **Awareness:** *stakeholders should be aware that the Street Lab is occurring, and have easy access to more information if desired*

2. **Participation:** *there should be a diverse range of participation opportunities, corresponding to a diverse range of abilities and interests*

3. **Initiation:** *stakeholders should have the opportunities and support required to initiate projects*

Generally, these three categories follow a scale of increasing complexity: ideas within 'awareness' are easy to implement and supplement the current Street Lab direction. 'Participation' ideas are slightly more complex, and ideas in the 'initiation' category are larger-scale strategic initiatives.

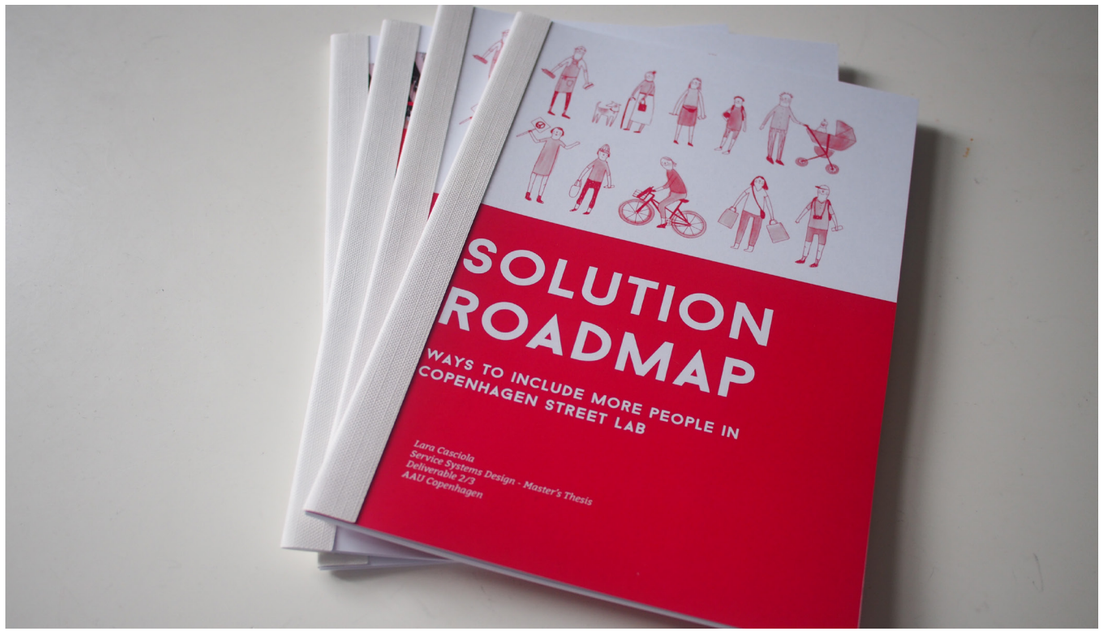





FIGURE 27
*[left] The printed deliverable*

FIGURE 26
*[below] This brand platform diagram (developed by the design agency Kontrapunkt) helps to clarify Street Lab's competencies, mission, and values. Shown here is my own conceptual version.*

## AWARENESS THROUGH PLACE BRANDING

As Street Lab is a high-traffic physical space, it a physical awareness strategy should be implemented. This involves the creation of a coherent, consistent identity, one which users can recognize and gather understanding from as they move through the space. This process is referred to as place branding. In recent years place branding has been used by Danish agencies to draw attention to emerging neighborhoods (see the collaborative effort to define Bellakvarter), and redefine old ones (see Urgent Agency's award-winning work with Billund), with great success.

In the case of Street Lab, the focus should be on providing a low-level, clear, digestible explanation of the project, utilizing teaching opportunities, and piquing the interest of passers-by through visualization. Figure 27 explains the basis of the brand, and the following pages contain some specific examples of the roadmap vision.

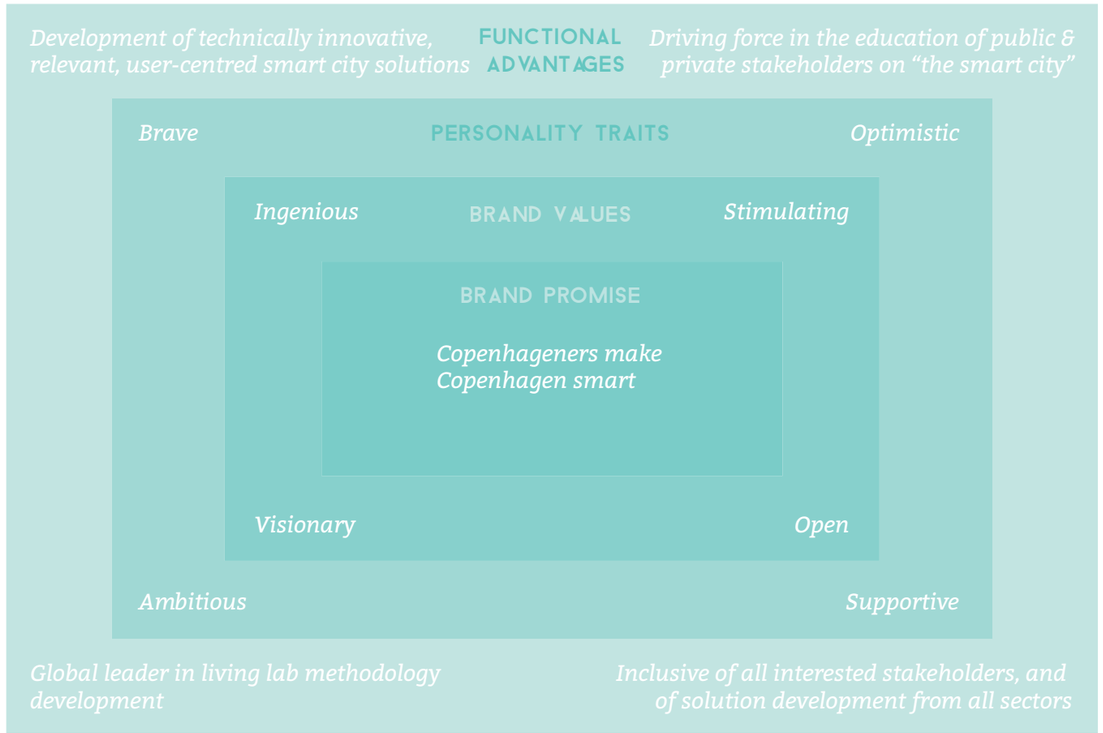



FIGURE 28
*[above] projects should be clearly described where possible through a fact-based campaign. Signs placed in the area could pique the interest of passers-by, and highlight some of the information being uncovered in the lab.*

FIGURE 29
*[right]To initiate more dynamic engagement from passers-by, simple interactive exhibits could be created. By gathering data from citizens in an engaging, analogue format, a valuable teaching situation could be created. This strategy could also be leveraged to gather meaningful information – a totally different kind of sensor.*



**FIGURE 30**
*[left, top] equipment installations should be labelled, increasing transparency and adding interest to otherwise overlooked aspects of the urban landscape*

**FIGURE 31**
*[left, bottom] data should be visualized clearly and dynamically, preferably directly within Street Lab*

**FIGURE 32**
*[below] the place brand should be supported with access to digital information*

# PARTICIPATION THROUGH PARTNERSHIPS

Getting users to participate actively in Street Lab requires a multi-legged approach. Given the breadth of the potential user group, varying channels precisely targeting different groups are essential. These channels should cater for differing levels of commitment, interest groups, knowledge levels, and demographics – but all should strive to impart some knowledge about smart city technologies, and gather feedback and input from participants.

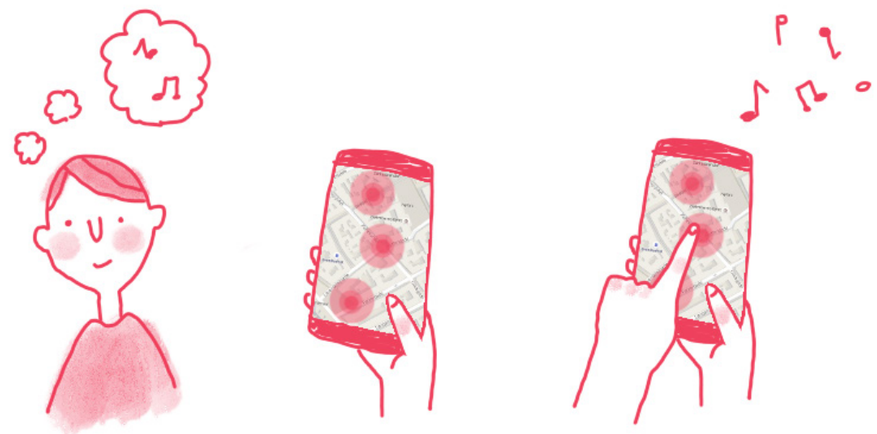
The task of developing all these channels is likely to be beyond the scope of any one organization – and certainly beyond a small municipal department. A series of private and public-sector partnerships is therefore suggested. Bringing in partners from outside the technology sector and connecting them with tech actors (students, startups, SME's, or larger corporations involved in technology development), then facilitating a concept development process, could result in a wide range of innovative initiatives within Street Lab. This strategy requires the development of strong soliciting, conceptualizing, and support capabilities from the CSL organizers.

To explain this concept, partnership maps (Figures 33 & 34), a partnership journey (Figure 35) and an example case [below] are described.

### *Example Case: Distortion*

Distortion is a street festival within Copenhagen, with various musical acts placed in the streets and crowds moving from act to act. Part of the festival takes place in downtown Copenhagen. A partnership with Distortion could be a good way demonstrate some smart city ideas in a fun and dynamic way, with a younger demographic. In the iteration proposed here, an urban sound sensor company could be involved, and festival-goers could preview the acts (and decide which area of the street to stand in) through data.kk.dk.

Concept was first decribed by the author and three collegues as part of a video prototyping course. See video and collaborators here: youtube.com/watch?v=by5hav_OcxY



*user decides to attend Distortion festival*

*user opens Distortion web app and can view a map of the festival area, with areas of noise highlighted*

*user can tap on the highlighted noise areas to hear a live stream of the music in that area*



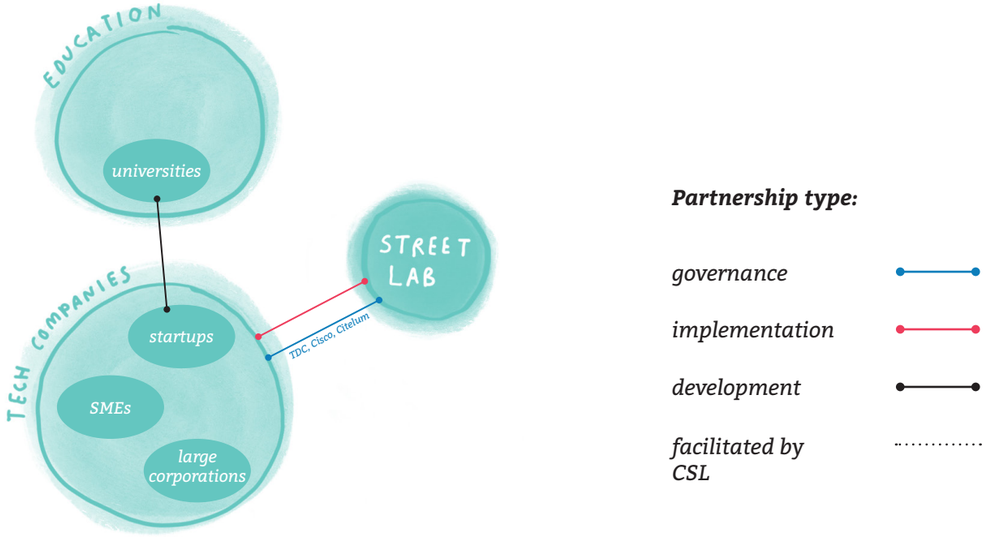



FIGURE 33
*[above] Street Lab partnerships today*

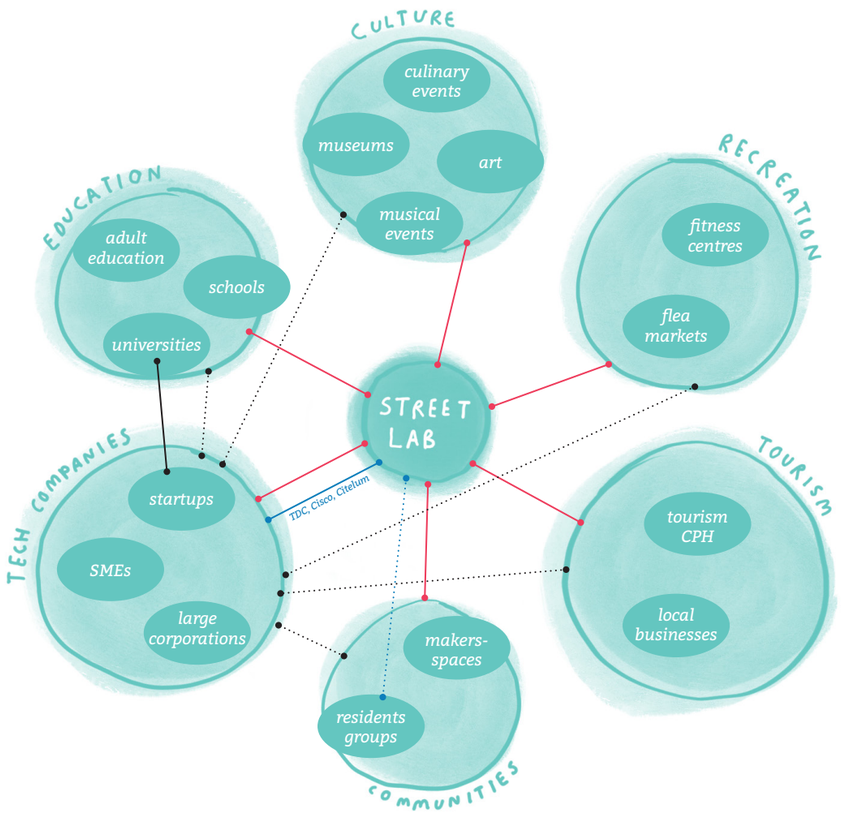
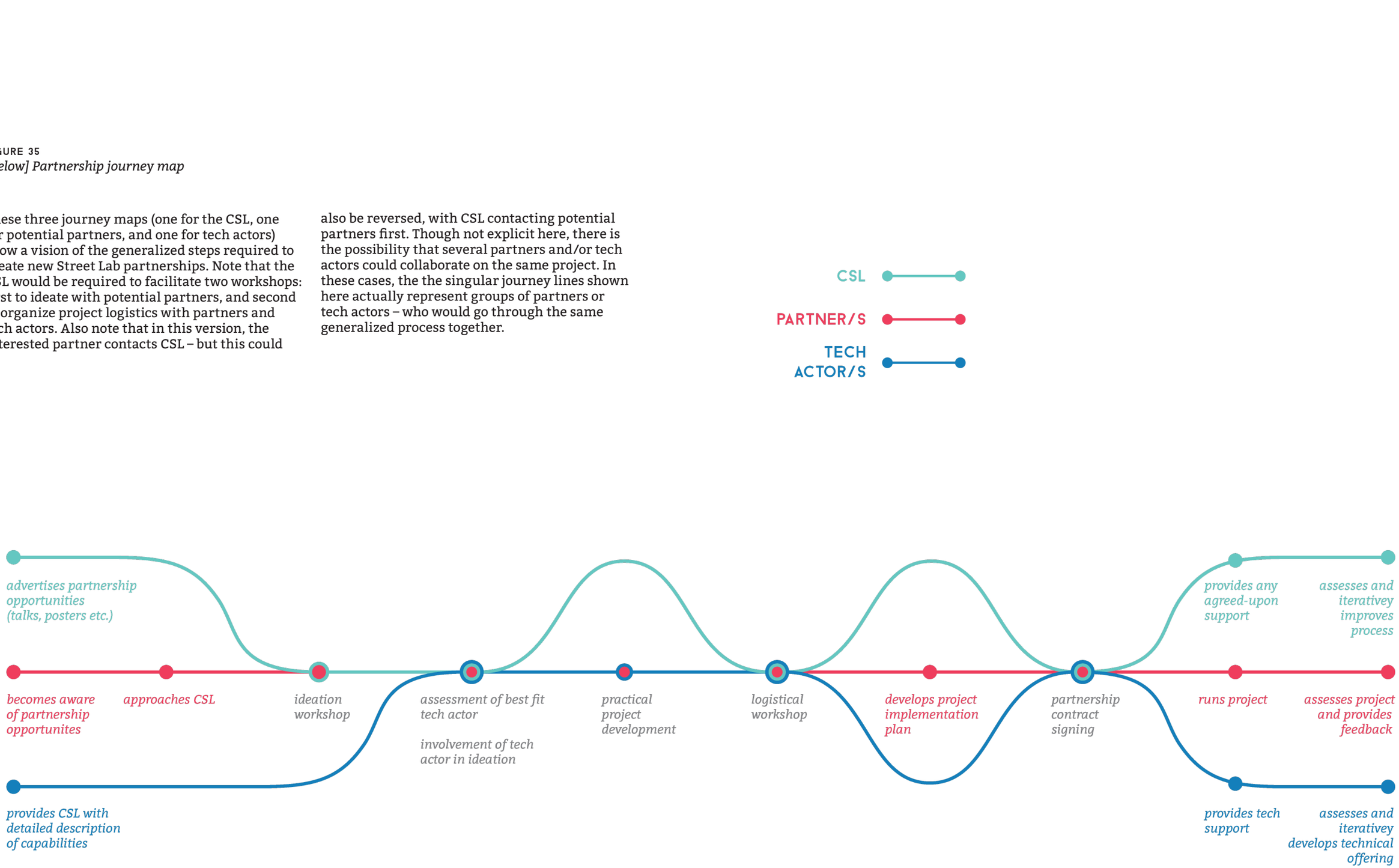



FIGURE 34
*[above] A possible future vision of Street Lab partnerships*

FIGURE 35
*[below] Partnership journey map*

These three journey maps (one for the CSL, one for potential partners, and one for tech actors) show a vision of the generalized steps required to create new Street Lab partnerships. Note that the CSL would be required to facilitate two workshops: first to ideate with potential partners, and second to organize project logistics with partners and tech actors. Also note that in this version, the interested partner contacts CSL – but this could also be reversed, with CSL contacting potential partners first. Though not explicit here, there is the possibility that several partners and/or tech actors could collaborate on the same project. In these cases, the the singular journey lines shown here actually represent groups of partners or tech actors – who would go through the same generalized process together.

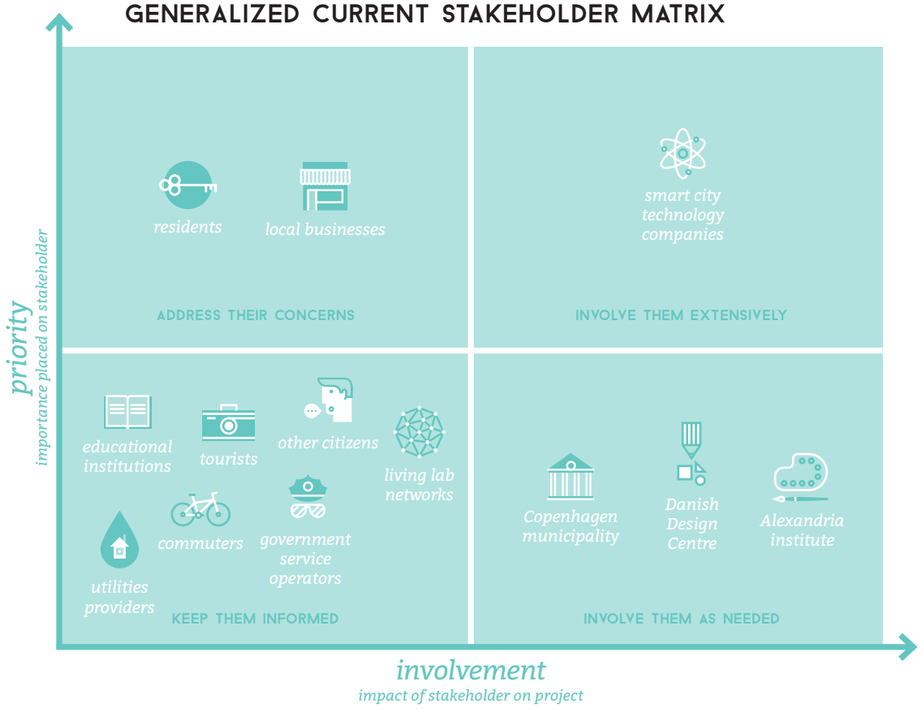


# INITIATION THROUGH A POPUP PLATFORM

In ideal circumstances, Street Lab could become a hub of diverse stakeholder involvement through the creation of a centralized, inclusive, physical space in which users could associate with smart city development. Modelled after projects such as Citilab in Cornellà de Llobregat, the space should offer introductory instruction to all who desire it, as well as specialized workshops and programs for various demographics. One way to make this endeavor more manageable is to go with a 'popup' model - a temporary, pre-planned space. In this iteration, the involvement platform could exist for two months in middle of the Street Lab timeline, with activities planned in advance. Suggested here is a time period from May - June 2017 for the Street Lab Popup. This time period allows for a year of planning and organization, and a year to implement any ideas developed during the popup. The first steps of this planning process are exemplified here.


FIGURE 37
*[right] A stakeholder matrix like the one shown here should be used to prioritize stakeholder involvement. Key strategic groups should be targeted with initiatives. In this way, the temporary pop-up can permanently shift stakeholder involvement according to overall strategic goals.*

FIGURE 36
*[below] Potential components of the popup plaftform*



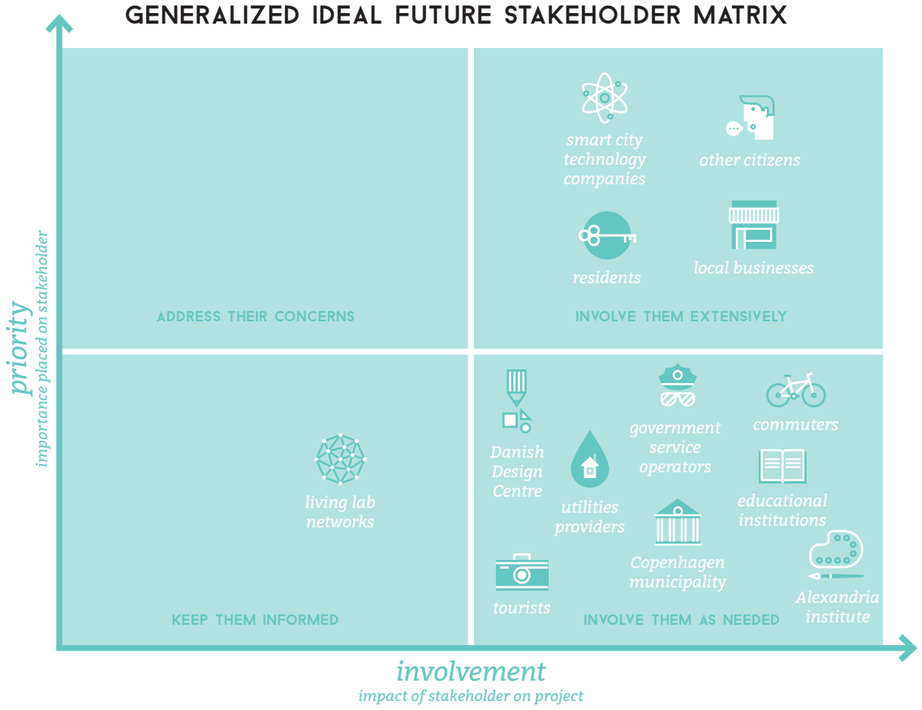
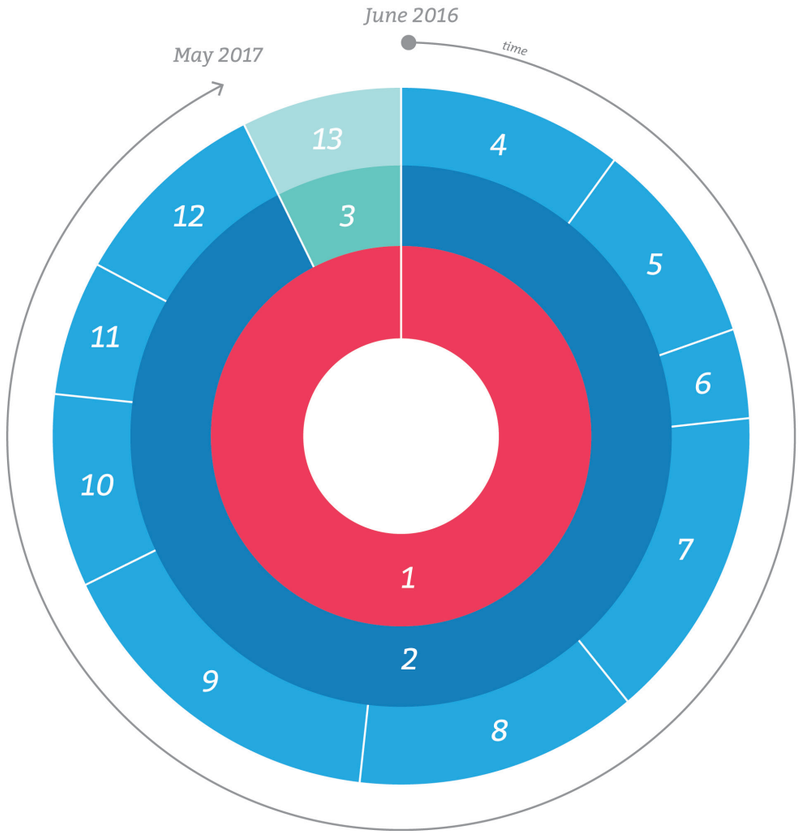



FIGURE 38
*A possible timeline for project implementation*




1. *Street Lab participation pop-up*
2. *Organization*
3. *Operation*
4. *Determine overall functional goals*
5. *Prioritize stakeholder involvement*
6. *Assess internal capabilities*
7. *Adjust capabilities as necessary (hiring, partnerships, etc.)*
8. *Plan components (programs, events, etc.)*
9. *Organize physical location*
10. *Create detailed schedule*
11. *Determine and implement publicizing strategy*
12. *Setup*
13. *Run Street Lab pop-up*



# Feedback

*I sent a digital version of the solution roadmap to various stakeholders to solicit feedback.*

## DDC

The DDC was enthusiastic about the suggestions, and offered no improvement suggestions. They suggested that a workshop be organized with participants from the CSL, in order to better explain and discuss the ideas – a proposition that I accepted with enthusiasm as it aligned well with my previously described plan.

## CITIZEN INCLUSION EXPERT

I also sent a copy of the roadmap to Peter Munthe-Kaas, who I previously interviewed regarding the state of inclusion processes in Copenhagen's urban development. He responded positively, stating that the ideas "looked exciting.. and contained good perspectives on what could be done". He did mention, however, that the format could have been a little more open and easy to discuss – presenting, for example, more different directions and their implications. He also mentioned that a workshop would be an ideal format to move forward with the material, getting participants from the municipality to openly discuss potential directions.

## CSL

Copenhagen Solutions Lab was also generally enthusiastic about the suggestions. The place branding strategy was especially well-received, and has been passed to Copenhagen Municipality's internal design team for inspiration and guidance as they develop a finalized brand and awareness strategy for the project.

The partnership and popup platform suggestions were more cautiously received. With regard to increasing partnerships, there were concerns about what kinds of benefits Street Lab could extract from those participating. Currently, there are no tools or protocols in place for assessing the value of including certain stakeholders – and in the absence of this, it could be difficult to determine which kinds of partnerships could provide the most benefit.

It was also mentioned that convincing the technological partners involved in Street Lab to invest in an involvement platform could be difficult, as their priorities lie more in technical side of smart city development. As the Street Lab's development costs are to be evenly split between the investors, it may be difficult to move ahead with something like this.

Finally, the CSL showed interest in the process I followed leading up to my ideas. The simple design research process I followed, going out into the Street Lab area and actively observing and quesitoning passers-by, was something that they hadn't engaged in themselves.

## NEXT STEPS

I was faced with the decision, at this point, whether or not to continue developing the services described in the solution roadmap (the partnership facilitation service and the popup inclusion platform). Though I do believe both to be viable and appropriate routes to more diverse inclusion, the response from the CSL highlighted that more detailed definitions of these services likely would have little to no impact on project progress – more work was needed on changing priorities before proposing totally new initiatives. I therefore left the services partially defined and moved forward into the next planned acts of design activism.

# *Workshop*

Based on the suggestions of both the DDC and the urban inclusion expert, a workshop was organized to work more with the ideas in the solution roadmap and develop new ones. Two project organizers from the DDC Design Cities project attended, as well as a project organizer from the CSL working on Street Lab (Sune Fredskild, who I previously interviewed about the project). I also invited an independent citizen with little knowledge of the project, with the aim of getting an external perspective in the discussion.

The goal of the workshop was to discuss my solution roadmap – to assess the workability of the ideas, to hear other's thoughts on the what kinds of solutions should be prioritized, and to assess whether a final deliverable was required.

As mentioned, the ideas in the solution roadmap were designed to function as sacrificial concepts (Mikael, 2008) at this stage – used to inspire discussion, dissection, and transformation.

This workshop comprised the final planned act of design activism, the event (see page 36 for description and goals).

## FORMAT

I planned the workshop in two stages. To begin, I presented a very brief overview of my project direction, research on best practice, and solution roadmap – to ensure that all stakeholders in the room had the same base knowledge of the project. I then presented a simple conversation tool, with which I hoped to guide the discussion (Figure 39). This consisted of a large bulls-eye, with three levels corresponding to the levels of stakeholder engagement (awareness, participation and initiation). I also printed cards with various stakeholders on them, and the idea was that by physically moving the cards through the levels, we might be able to discuss concrete solutions for specific groups.

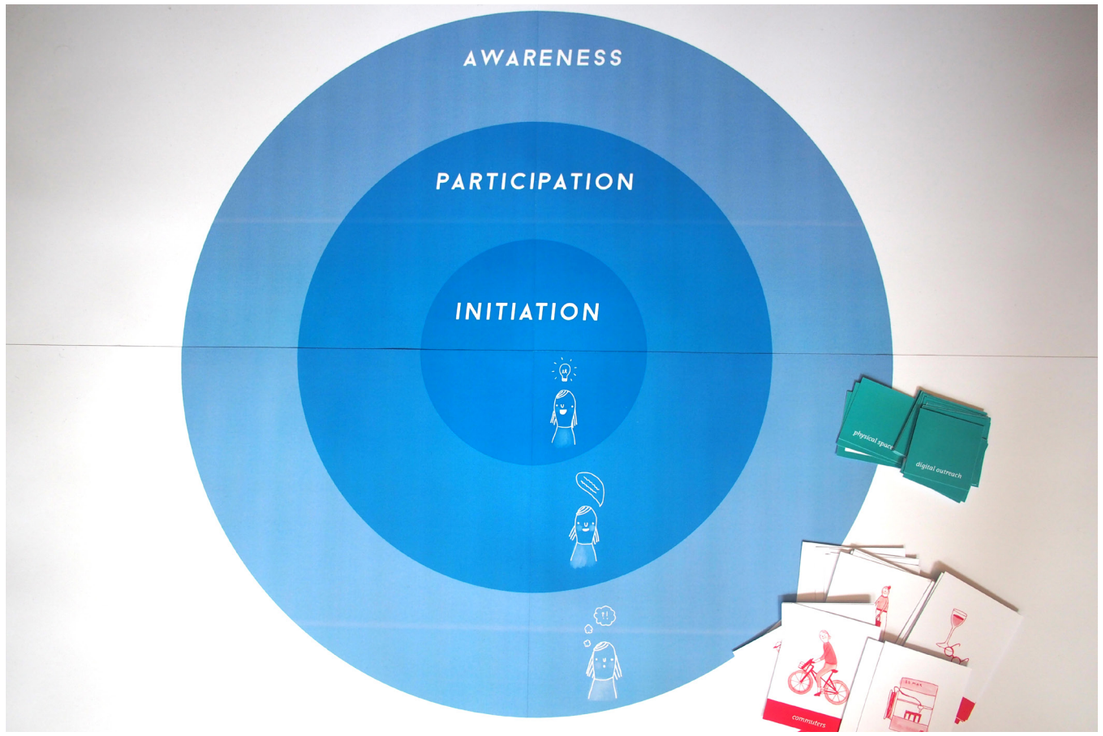
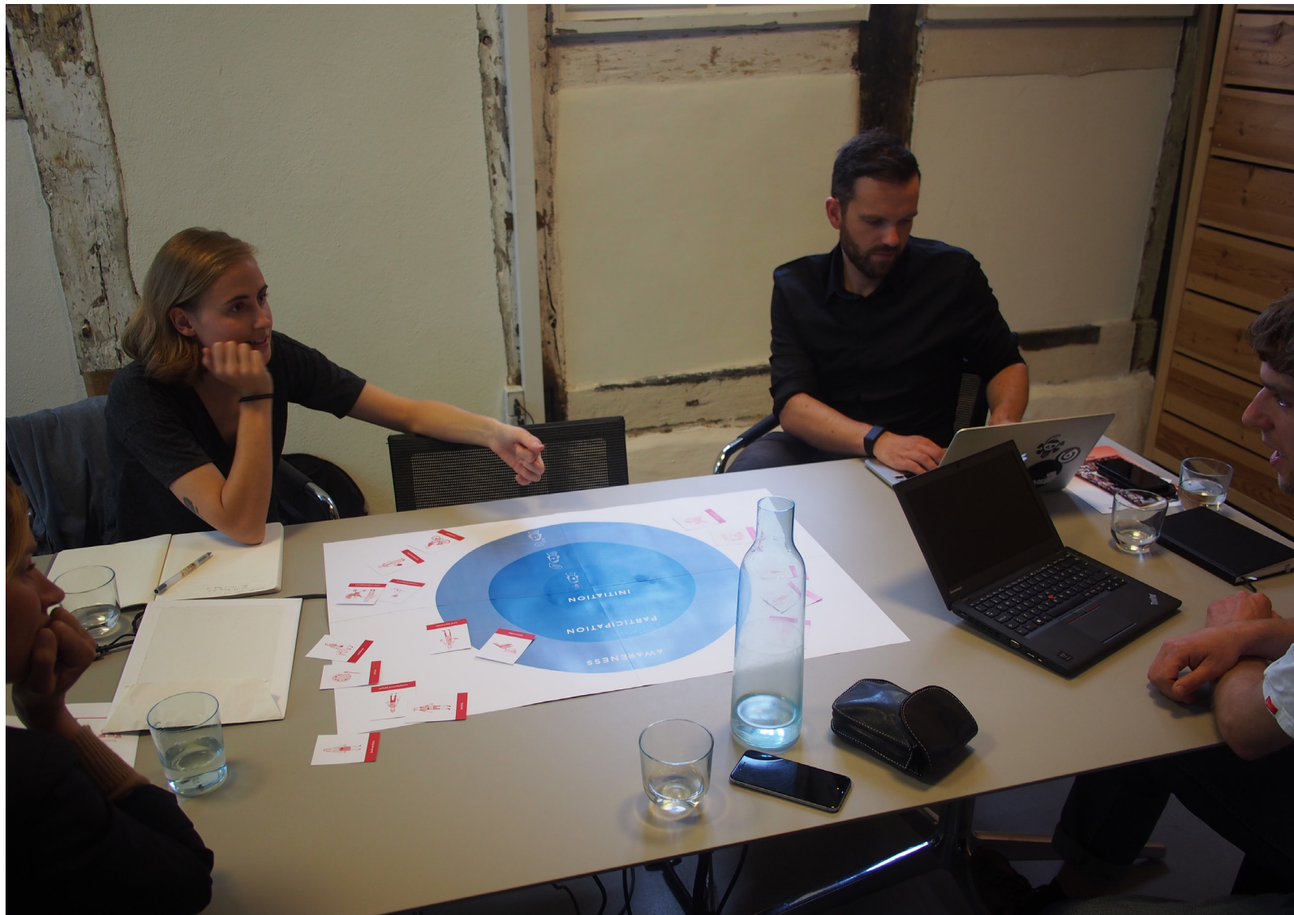



FIGURE 39
*[right, top] The physical discussion tool, a 'gameboard' with stakeholder cards*

FIGURE 40
*[right, bottom] The workshop setup. Participants sat around a square table in a DDC meeting room.*



# RESULTS

The workshop was highly informative. Participants were positive about the ideas presented, and the discussion was active and engaged. Participants used the discussion tool and discussion ranged from defining the actual goals of Street Lab, to mentioning particularly important stakeholder groups, to discussing potential next steps. Several particularly noteworthy discussion topics are summarized here.

**1. Diverse stakeholders as value providers**
It is important to not only think about how to involve diverse stakeholders, but to also consider what value these stakeholders can provide. By clearly defining this, specific initiatives aimed at accessing this value can be designed, and it becomes easier to prioritize various initiatives. For example, though intuitively tourists may not seem like a top priority for involvement (due to their lack of experience with Copenhagen, and their transience), this explorative, slow-moving population could be an easy target for engagement in the testing of digital signage – and therefore, based on this value they can provide, their involvement should perhaps prioritized.

**2. Breaking down municipal silos**
Cultivating a culture of openness and collaboration is high on the agenda for Copenhagen Municipality. One strategy they are taking to achieve this is to make 'smart cities' a horizontal, wide-reaching topic: involving diverse municipal departments in projects related to making Copenhagen' smarter'. Street Lab could be a good focal point for these initiatives, demonstrating the benefits of open data not only for residents and local businesses, but also for municipal workers themselves.

**3. Engaging a stakeholder panel**
One concrete suggestion to come out of the workshop was the recruitment and implementation of a 'panel', or interested stakeholder group, would could help guide the Street Lab decision-making process and also help field the inevitable questions and comments that greater awareness of the project will bring. A smart city citizens panel is already implemented within Copenhagen Municipality, but they haven't been involved in Street Lab to a high degree. By creating a panel more specific to Street Lab, and more inclusive of a diverse range of viewpoints, it may be easier to utilize this group.

**4. The problem-defining role of Copenhagen Municipality**
Sune described that the current role of the CSL, and one they are having some difficulty with, is as a problem-defining body. Technical partners come to them wondering what urban issues to prioritize, and are generally pointed towards the overall goals of Copenhagen Municipality – ie. greater sustainability, becoming carbon neutral, and increasing mobility. There is discussion within the CSL office with regards to more personal, specific problems, but no in-the-field research with citizens and businesses in the Street Lab area has been performed.

**5. Goals of technical partners**
One topic that was stressed was that the goals of Cisco, Citelum, and TDC were very much the development of new technology. As previously mentioned, each of these partners, plus Copenhagen Municipality, have put forward an equal share of capital, and therefore share an equal slice of the governance of the project. The technical partners hope to gain value through the development of new, marketable technologies in the area. An approach to diverse stakeholder inclusion which highlights the specific, quantifiable value that various stakeholders could bring to solution development is therefore more aligned with the goals of the technical partners.

**6. Social impact versus technical innovation**
The current setup of Street Lab focusses on later stages of project development, with a centre of interest around scalability and market-readiness. This approach makes it difficult to develop any radical technical innovation within the area, as agile iteration and development are not highly supported. These earlier stages currently take place off-site, in technical company's own premises. The true innovation within the area may well be more social than technical – by promoting the work that Street Lab is doing, the general level of awareness about smart cities and open data can be raised.

**7. Awareness as success**
The workshop participants were in agreement that although diverse stakeholders may not all reach the participation or initiation levels, even a generalized awareness could be considered successful. As the current level of smart city awareness within Copenhagen is quite low, Street Lab could and should function as a centralized place of learning. An important note here was that this general awareness must come with channels for further involvement if stakeholders are motivated – it could be an extremely frustrating situation to become aware of Street Lab but have no way to learn about what value one can gain and provide.

**8. Balancing priorities**
The CSL is a small municipal department, managing the large Street Lab project and co-ordinating with a diverse range of partners. It can be difficult, therefore, to keep in mind the issue of diverse inclusion, as other, more pressing, daily tasks take up concentration. The workshop provided a reminder for participants, but overall the culture of Street Lab governance needs to provide reflexive reminders in order to carry these goals through. One suggestion was to involve a separate employee who could focus just on the issue of diverse stakeholder engagement, providing the required reminders and necessary prompts.

# *Next Steps*

*One thing that really came through in the workshop was an opportunity for one more kind of deliverable. The solution roadmap detailed my own vision for Street Lab's future, but based on feedback from the workshop I realized that a set of tools could help Street Lab's organizers keep users in mind while creating their own visions – one more opportunity to influence the project's inclusiveness.*

This final deliverable comprises a new addition to the previously described design activism plan (Figure 41), and is detailed in the yellow box.

The inclusion toolkit deliverable comprises the major service design artifact of the thesis, and is described in full in the following section.

**Artifact 4:** *a toolkit (an act of communication)*

**What:** A set of tools and recommendations aimed at combatting a selection of the issues uncovered during the workshop (issues which are preventing the implementation of some of the solution roadmap ideas).

**Why:** Street Lab is a complex project, with a web of divergent priorities among the governing actors. Unifying these actors behind a vision of inclusion was dismissed as difficult during the workshop, due to a strong focus on technical development. A set of tools could help to ensure that user needs are kept in mind across all strategic decisions, and is perhaps a more practical way of uniting the governing actors behind this goal.

**Goals:** The toolkit should be totally self-explanatory, compelling, and precisely targeted. Actors within the CSL, technical partners, and other stakeholders should be able to quickly realize the value of the tools, and be able to independently leverage them.

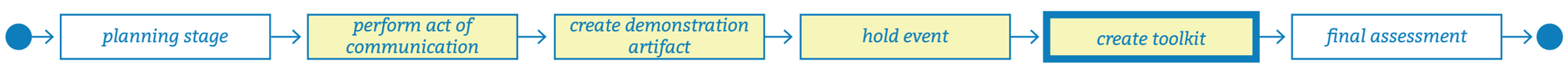



FIGURE 41
*The finalized design activism plan, with the final deliverable added on. Note that decision points are not shown here.*

# INCLUSION TOOLKIT

*Based on feedback from the workshop, I created one final deliverable outlining a concrete set of issues, and accompanying tools, that the governing bodies of Street Lab (both the CSL and technical partners), as well as other street lab / living lab organizers globally, can use to guide projects in a user-centred, inclusive direction.*

The toolkit is not a complete solution – more areas of development are required for a lab to become truly inclusive – but by following the steps presented, a strong user-centred foundation can be developed. Suggestions are as practical, simple, and visual as possible, as the deliverable is designed to be completely self-explanatory.

To involve diverse stakeholders, these stakeholders must first be identified. As such, the toolkit begins by guiding users through basic user observation, identification, and categorization processes (observation, interviews, and personas). It then moves into problem definition and stakeholder prioritization, and finally defines a concrete suggestion for increased diverse stakeholder inclusion and project governance.

The resources in this toolkit are licensed under a creative commons license, as they will be open for use by all living lab organizers (and other interested parties). As they are used, iterative improvements based on real-world user experience will strengthen them. The toolkit will be available soon through the DDC website.

## *Structure*

This toolkit contains five areas of recommendation, designed to act as a guide through five steps towards a more user-centred, inclusive approach to Copenhagen's Street Lab. Each tool contains a description of its intended purpose, a guide for usage, and the resources necessary to independently use it. Tools are named according to their function (Figure 42).
The tools contain elements of the research methods and ideas presented throughout this thesis, building upon the methods that worked well or were well received and improving those that were not as successful. It's important to note that the tools presented here are by no means 'finished' – as they are put into use they should be developed, improved, and adjusted to better fit certain tasks. This process will hopefully occur in the real world, as they are shared, adapted, and applied to various projects.

FIGURE 42
*The tools contained within this kit*

# 1. GETTING TO KNOW THE USERS

*In order to better choose projects, and develop a targeted inclusion strategy, we need to get to know the potential users of Copenhagen Street Lab. This includes identifying their needs, wants, habits and motivations, as well as their various demographics.*

## RECOMMENDATIONS

The best way to do this is to go out and talk to the people in the Street Lab area. Ideally, an individual could be assigned to this task over a period of several months, building a detailed body of knowledge about a broad range of users. One way to accomplish this could be to assign the task to a student worker or design research intern.

## RESOURCES

Two resources have been developed: a brief citizen survey guide (R1), and a safari guide (R2).



RESOURCE 1

# CITIZEN SURVEY

This survey is a first step in getting to know the users of the Street Lab area. It is based on the guide I used when researching the area, with some added detail. The aim of the survey is to gather a broad overview over who is using the space, and for what reasons.

**TO USE:** *this guide should be used to structure brief, casual, spontaneous interviews with people in the Street Lab area. To use, walk through the area and approach as many people as possible, filling in copies of the guide.*

### *Citizen details*

**AGE:**

**OCCUPATION:**

INTERVIEWER:

DATE:

### *Questions*

**WHY ARE YOU IN THIS AREA TODAY?**

COMMUTER TOURIST RESIDENT WORK HERE OTHER

**HOW OFTEN ARE YOU HERE?**

**HOW COULD THIS PART OF COPENHAGEN BE IMPROVED?**

**WHAT DO YOU LIKE ABOUT THIS PART OF COPENHAGEN?**

RESOURCE 2

# SAFARI GUIDE

Safaris (observational walk-throughs) in the Street Lab area will also help to develop a clearer picture of user habits. This guide provides an overview of key things to look out for while observing in the area.

**TO USE:** *Simply walk through the Street Lab area, moving through this guide and noting the answers to questions. This exercise can be completed very quickly, or extended for more detailed observation.*

## *Safari details*

PARTICIPANT:

DATE:

**TIME OF DAY:**

**LENGTH OF SAFARI:**

## *Observation guide*

**WHAT KINDS OF PEOPLE ARE HERE TODAY?**

**WHAT ARE THEY DOING?**

**WHAT IS THE PHYSICAL CONDITION OF THE AREA?**

**OTHER NOTEWORTHY OBSERVATIONS**

# 2. KEEPING USERS IN MIND

*It's not enough just to know Street Lab's users: we also need to continuously keep their interests in mind. This means defining user motivations as clearly as possible, as well as providing physical reminders within workspaces.*

## RECOMMENDATIONS

Personas are a perfect tool to fill this role. Putting a face on a collection of research dramatically improves ease of use, allowing the research to more easily enter casual conversation. Printing the personas and putting them up around the office space could help to provide a physical reminder to bear in mind user interests.

## RESOURCES

Four example personas are included here, based on my research (R3.1, R3.2, R3.3, R3.4). A template is also included for creating more personas (R4).

RESOURCE 3.1 – PERSONA

# ANNA, 24

## BIO

*Anna is a student at ITU, who works three days a week at a design agency in the city centre. On her way to work, Anna bikes through Rådhusplads twice a day – in the morning and in the evening.*

## INTERESTS

- ***Healthy living.*** *Anna cares about eating well and tries to excersise several times a week.*
- ***Social connection.*** *Anna has a strong group of friends and enjoys going out with them on weekends.*
- ***Professional development.*** *Anna is focussed on developing her career as she studies.*

## FRUSTRATIONS

- *Construction in bike lanes*
- *Bad weather during her commute*
- *Crowds and tourists blocking the bike lanes*

***Interest in Copenhagen's development***

***Knowledge about smart cities & open data***

RESOURCE 3.2 – PERSONA

# DORTE, 72

## BIO

*Dorte has lived on Vester Voldgade for the past 30 years. She is retired, and lives alone with her small dog.*

## INTERESTS

- ***Volunteering & community.*** *Dorte belongs to a women's group and spends several hours a week volunteering at various charity events*
- ***Her dog.*** *Dorte feels a deep connection with her pet, and spends much of her day walking it through the neighborhood*
- ***Activism.*** *Dorte is interested in current affairs, and participates in town hall meetings for various projects and proposals*

## FRUSTRATIONS

- *Speeding cyclists*
- *Not being able to voice her opinion*
- *Isn't comfortable with technology*

***Interest in Copenhagen's development***

***Knowledge about smart cities & open data***

RESOURCE 3.3 – PERSONA

# JOHAN, 30

## BIO

*Johan is from Germany, visiting Copenhagen for the first time with his wife and two young daughters. They're staying for a week, and their hotel is in the city centre.*

## INTERESTS

- ***History.*** *Johan loves learning about the past, and as such makes an effort to visit historical sites and museums*
- ***Family life.*** *Johan prioritizes his family over all else*
- ***Healthy living.*** *Johan cares about eating well and jogs weekly*

## FRUSTRATIONS

- *Lack of 3G while travelling*
- *Inability to find good restaurants while abroad*
- *Crowds of other tourists at major sites*
- *Difficulty finding child-friendly attractions*

***Interest in Copenhagen's development***

***Knowledge about smart cities & open data***

RESOURCE 3.4 – PERSONA

# MATHIAS, 45

## BIO

*Mattias owns a hot dog wagon which he parks daily on Rådhusplads. He works there from 7-3 daily during the week, and employs a student worker for the afternoon and weekend shifts.*

## INTERESTS

- ***Social connection.*** *Mattias has a strong group of friends, who he sees weekly for card game evenings*
- ***Current events.*** *Mattias enjoys keeping up-to-date with both global and local news stories, and spends much time reading news websites*
- ***Family life.*** *Mattias has a girlfriend, and his parents, siblings, nieces and nephews play a large role in his life*

## FRUSTRATIONS

- *Overly enthusiastic protesters*
- *Cyclists who ride through Rådhusplads*
- *Boredom on slow days*

***Interest in Copenhagen's development***

***Knowledge about smart cities & open data***

RESOURCE 4

# PERSONA TEMPLATE

This template should be used to create personas – imaginary people who exemplify a collection of researched traits.

**TO USE:** *Fill in the blanks with information collected during observations, interviews, or other research techniques.*

NAME AGE

*[make these up, appropriate to the persona]*

*[choose an appropriate representation, either hand-drawn or from google images]*

## BIO

*[Write a small sentence about this person's overall occupation, and why they interact with the Street Lab area]*

## INTERESTS

*[Choose four or five interests to highlight, which can be used to determine motivations and approximate choices]*

- 
- 
- 
- 
- 

## FRUSTRATIONS

*[Choose 3-5 things that frustrate this persona, related if possible to their interaction with the Street Lab area and Copenhagen's urban space in general]*

- 
- 
- 
- 
- 

***Interest in Copenhagen's development***

***Knowledge about smart cities & open data***

*[estimate the level for these two bar graphs based on research and mark bar]*

# 3. DEFINING REAL-WORLD PROBLEMS

*Clearly defining user issues is an extremely important step in ensuring that solutions developed and tested in Street Lab are relevant and useful.*

## RECOMMENDATIONS

An 'opportunity bank' could be built up by consistently assessing user research for potential problems, defining them, and rephrasing them as design challenges. These opportunities could be useful in advising tech companies, setting Street Lab goals, and devising inclusion tactics.

Within design, problem statements can be built up using various frameworks. The 'problem statement builder' included here is based on IDEO's 'how might we' method (IDEO, n.d.).

## RESOURCES

A problem statement builder that phrases identified problems as 'how might we' questions is included here (R5).

RESOURCE 5

# PROBLEM STATEMENT BUILDER

This guide bridges the gap between observed issues and user insights, and actionable problem statements.

**TO USE:** *Follow the instructions described at each step.*

## STEP 1.

CHOOSE A PREVIOUSLY OBSERVED AND IDENTIFIED PROBLEM.

*ex. Bike lanes can become congested during peak commuter hours*

## STEP 2.

BY ADDING THE PHRASE 'HOW MIGHT WE' AND UNPACKING THE PROBLEM CONTENTS. CREATE THREE DIFFERENT STATEMENTS

*ex.*
*1. How might we reduce the number of cyclists during peak commuter hours?*
*2. How might we increase the capacity of bike lanes so they can handle more traffic?*
*3. How might we more evenly distribute bikers around the city during peak hours?*

## STEP 3.

ASSESS EACH STATEMENT. CAN YOU QUICKLY THINK OF ANY SOLUTIONS? IF NOT. THE STATEMENT MAY BE TOO NARROW. IF YOU CAN THINK OF A HUGE RANGE OF SOLUTIONS. THE STATEMENT MAY BE TOO BROAD. ASSESS ALSO FOR STRATEGIC IMPACT.

*ex. Using the previous three statements:*
*1. Not strategically ideal as it goes against Copenhagen's goals of a bike-friendly, green city.*
*2. Probably too narrow a statement.*
*3. Could result in some interesting solutions - perfect!*

## STEP 4.

FINALISE PROBLEM STATEMENT. ENSURE THAT IT IS CLEAR AND CONTAINS ALL NECESSARY INFORMATION.

*ex. How might we more evenly distribute bikers around the city during peak hours, to reduce bike lane congestion?*

## STEP 5.

SPREAD PROBLEM STATEMENT! PASS THE DESIGN CHALLENGE ON TO STUDENTS, STARTUPS, AND INDUSTRY.

# 4. ASSESSING STAKEHOLDER VALUE

*Not every stakeholder can and should be included in Street Lab. As resources are always limited, conscious decisions should be made with regard to which users are prioritized. In order to do this, the value that specific user groups bring to the solution development process must be defined.*

## RECOMMENDATIONS

In order to ensure that those who are involved in Street Lab provide benefit to the project, value assessments and a stakeholder prioritization matrix should be completed for each new initiative. By clearly defining these areas, we ensure that the relevant stakeholders are involved, and we maximize the value these stakeholders can provide. These tools can also help communicate between the CSL and technical partners with regard to the benefits to user inclusion.

## RESOURCES

Two resources are included in this section, a value definition tool (R6), to assist in identifying specific stakeholder value, and a stakeholder prioritization matrix (R7).

RESOURCE 6

# VALUE DEFINITION

This tool can be used to identify the specific value that stakeholders can provide to Street Lab projects, as well as providing advice on whether or not it is worth including them.

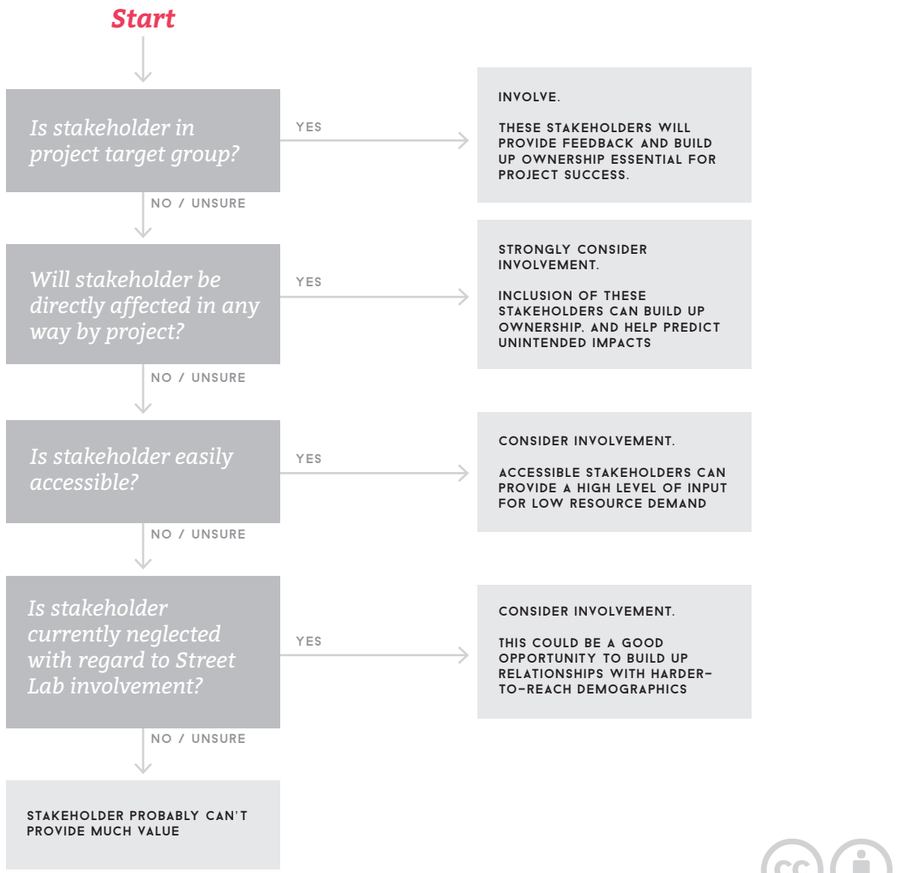
**TO USE:** *Should be completed at the during the planning stage of every new product/ service implemented in Street Lab. Follow the two-step process described below.*

## STEP 1.

IDENTIFY AND LIST ALL POTENTIAL STAKEHOLDERS – PEOPLE WHO INTERACT WITH STREET LAB, OR WITH THE POTENTIAL TO IMPACT, OR BE IMPACTED BY, THE SPECIFIC INITIATIVE.

## STEP 2.

TAKE EACH STAKEHOLDER THROUGH THE SIMPLE FLOW CHART BELOW TO DETERMINE A ROUGH OVERVIEW OF VALUE POTENTIAL.

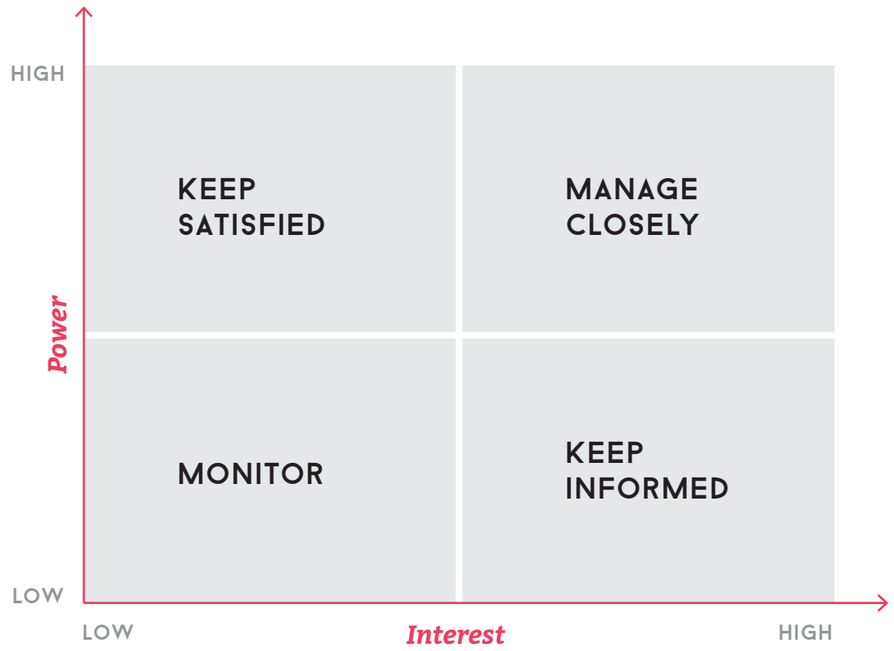



RESOURCE 7

# STAKEHOLDER PRIORITIZATION MATRIX

This matrix should be used as a second step, after the value definition tool, to further define an involvement strategy for stakeholders deemed relevant.

**TO USE:** *Place the relevant stakeholders in the matrix, organized according to the amount of power they have over the project, and the amount of interest they have in the project. The statement in each quadrant then describes the overall involvement strategy required for the stakeholders placed these areas (based on Thompson, 2002).*



# 5. SHARING RESPONSIBILITY

*Currently, the bulk of the responsibility for including diverse stakeholders in Street Lab falls onto the CSL. Spreading this responsibility around will both help to alleviate some of this pressure, and ensure a place for diverse stakeholders in Street Lab governance.*

## RECOMMENDATIONS

One way to alleviate some of this pressure, while adding polyphony to Street Lab's governance, could be to create a panel. This panel could help to guide the project, ensuring that solutions developed in Street Lab genuinely do improve life in Copenhagen. Note that although the panel is referred to 'citizen panel', stakeholders with various divergent viewpoints should be involved – including those from the private sector, for example, small business owners.

## RESOURCES

The first steps in drafting the structure and function of this citizen panel have been taken here, and presented in the form of blueprints (R8)

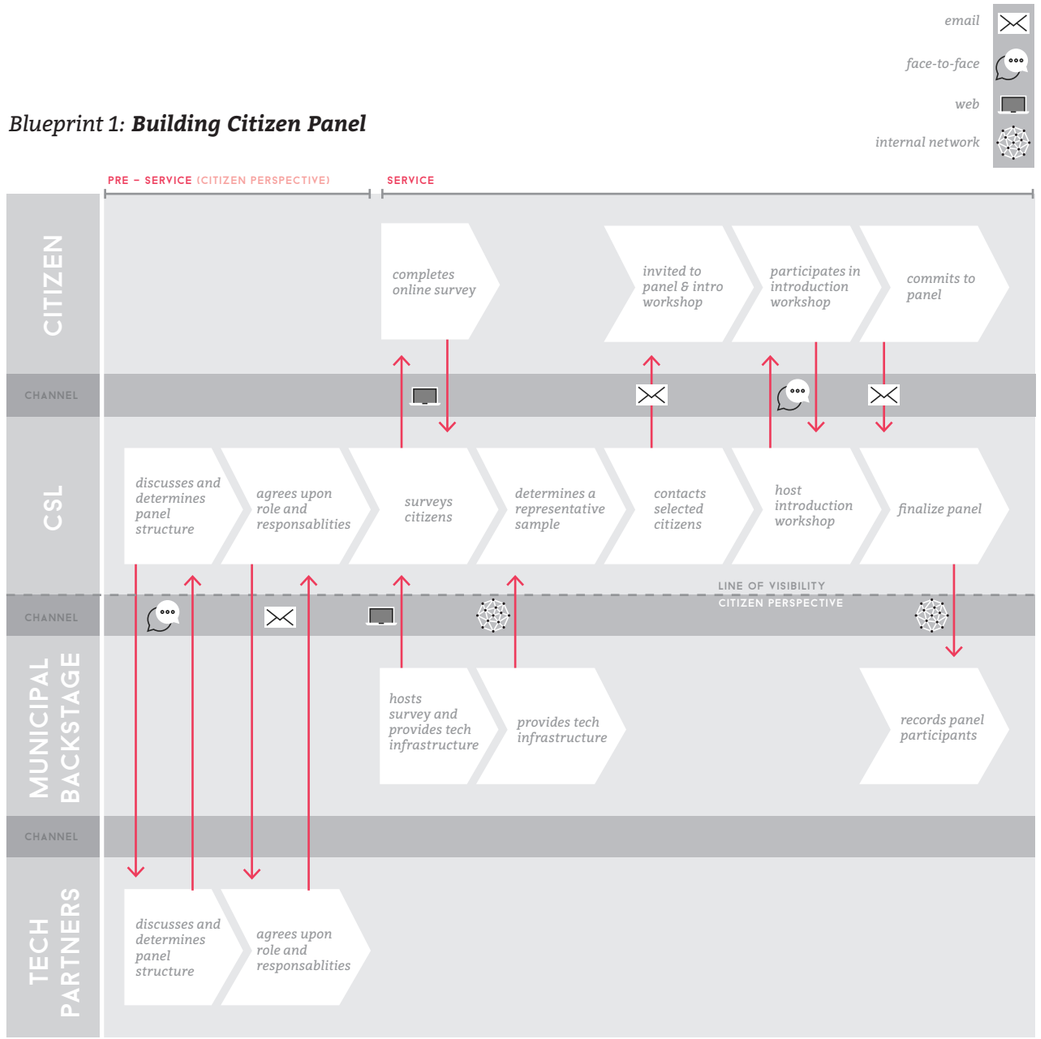
RESOURCE 8

# CITIZEN PANEL BLUEPRINT

These two blueprints describe the recruitment and function of a Street Lab citizen's panel. The first blueprint (this page) details the process of determining a representative group of citizens, briefing them, and confirming the panel. The second blueprint (over) details one iteration of how the panel might function.

**TO USE:** *Read the blueprint from left to right. Each row describes the user journey for a particular stakeholder group, and the arrows detail interactions. The 'channel' rows indicate the type of interaction occurring. The 'line of visibility' denotes the boundary after which certain stakeholder groups are unaware of each other.*

*Blueprint 1:* ***Building Citizen Panel***

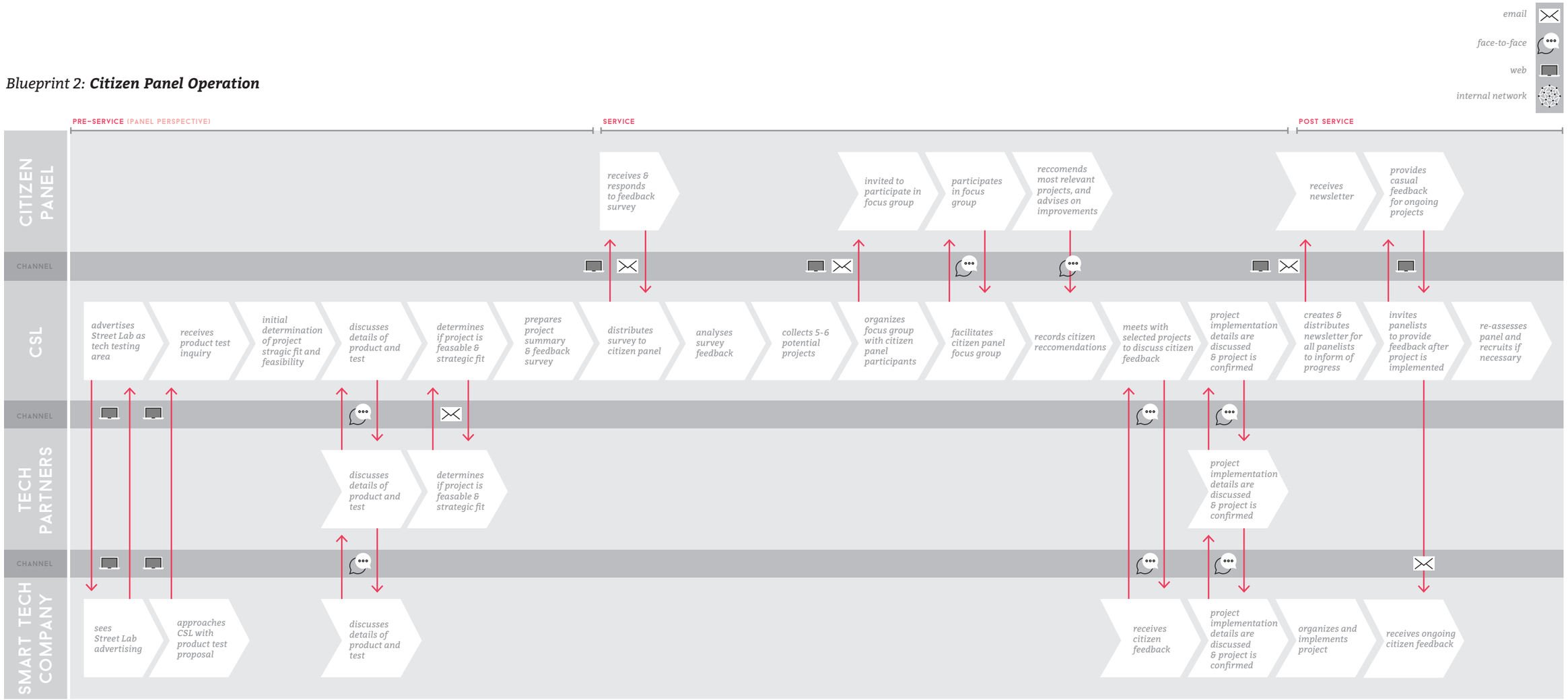


This blueprint shows the potential functionality of the Street Lab citizen panel. In the scenario detailed here, a new wave of smart city technologies is being selected and developed for implementation and testing in the lab.

Note that the stakeholders (listed on the left of the diagram) shown here are different from in the previous blueprint.

Note also that in this scenario, a positive outcome is assumed in all cases. For example, it is assumed that the project proposal is found to be good strategic fit, and it is assumed that the citizen panel also has a positive reaction to the proposal. Obviously, a project which is deemed incongruent with Street Lab's strategy, or unfeasible in some way, would not progress to citizen panel consultation.

*Blueprint 2:* ***Citizen Panel Operation***



# REFLECTION

*This section contains personal thoughts and discussion on the thesis progress and solutions developed, as well as conclusions drawn from the experience.*

## *Impact*

*Given the practical nature of this thesis, one of the most important reflection points is impact: did the design activism succeed in influencing governing actors towards greater inclusivity?*

Realistically, this is difficult to determine. Though deliverables were positively received, it will take some time before their effects (or lack thereof) are expressed in Street Lab's planning. This has to do with three factors: the short timeframe of the thesis, the typically slower progression of working with municipal projects, and my positioning as an external consultant.

In ideal circumstances, the thesis timeline would have stretched to include several months of facilitation and guidance, to ensure that the artifacts were properly considered. Building new priorities into an existing project plan takes time – time that unfortunately wasn't available.

Change can be difficult to implement within a public project with complex governance such as Street Lab. Without the access or time to properly investigate the existing power structures, it was difficult to ensure that design activism targeted the correct person. Even if the correct person was targeted, the diffusion of knowledge through such a complex stakeholder network is a gradual process.

As mentioned, I approached the CSL at the onset of this thesis with a proposal to collaborate, but they felt their resources were too stretched to take on a thesis student. I was, therefore, pushed into an external consulting role when dealing with Street Lab. This reduced my access to the project and the project organizers, and made gathering a complete picture of the project challenging – also ultimately slowing down project progress.

There have been, however, some definitive impacts. First, as mentioned, the place branding strategy presented in the solution roadmap has been taken into consideration within Copenhagen Municipality's internal design department as a guide for this process. Second, the discussion during the workshop clarified some of the issues that the CSL faces to all those involved – including the CSL representative. With the help of the DDC representatives, we were able to define some issues that previously hadn't been considered – for example, that the value anticipated from involving certain stakeholder should always be considered. The inclusion toolkit was designed to take into account some of these issues.

The inclusion toolkit has also been successful. Though at the time of writing not all relevant stakeholders have had the time to provide feedback, the response from the DDC has been very enthusiastic. As mentioned, the toolkit will be released under a creative commons license and distributed as a free downloadable resource on the DDC website. As the tools are used, they will hopefully gather constructive feedback and be collaboratively improved and adapted by street lab / living lab organizers globally. Feedback has been solicited from both the CSL and other street lab / living lab organizers – with the hope that their suggestions can improve the tools presented.

Finally, I hope that my persistence in exploring inclusion in Street Lab has had the effect of demonstrating that there is, in fact, a high level of external interest in this topic. My research showed that people are generally interested in Copenhagen's urban development – and Street Lab is a perfect opportunity to gain value from that interest.

## *Critical Process Analysis*

### USER CENTREDNESS

The process described here is, for the most part, user centred according to ISO standard 9241 (ISO/IEC, 2010). This standard describes six requirements for a user-centred process. The first is an explicit understanding of users, their environments, and their tasks. This understanding was present here, and was accomplished through

first-hand user research: interviews, observation, storytelling and shadowing.

The second requirement is that users should be involved throughout the process. In this case, users were involved at several research stages (interviews and discussion) and later more co-creatively through a workshop. One critique of this design process described here could be that users could have been even more involved – for example, solutions were mostly developed without citizen participation. It is important to bear in mind here that the focus of the thesis was on changing the perceptions of Street Lab's governing actors, not defining implementation-ready services. The solutions shown throughout this thesis are designed to be discussed and contemplated, and for the most part would require further development (preferably in close collaboration with users) to exist in the real world.

The third requirement is that the design is evaluated from a user-centred perspective. Given the nature of this project, a real-world attempt to change a situation, this was a requirement: CSL would not be influenced by work that didn't align with their reality.

The fourth requirement is that the process be iterative – clearly demonstrated here by the shifting process and multi-step design activism plan.

The fifth requirement is that the design addresses user experience from start to finish. By considering the various artifacts of design activism together as a group, this is demonstrated, as they build upon each other. From the perspective of Street Lab's governing actors, each artifact introduced new information into a slightly different area, rounding out the experience.

The final requirement, a multi-disciplinary design team, was not met as I worked alone. I did, however, work in collaboration with the DDC and of course relied on the advice of my diverse and enthusiastic classmates – helping to mitigate the effect of this shortcoming.

## LEARNING GOALS

This thesis meets the learning goals described. I independently identified a problem, then leveraged the methods and tools of service design to develop a set of solutions – the basic requirements as stated in the Service Systems Design curriculum.

My personal learning goals were also achieved. By exploring design activism, I used the tools of service design in a very different way than is my previous experience – and although difficult to measure, my thesis work did have a real-world impact.

## PARTNERSHIP

My partnership with the DDC brought both challenges and opportunities.

On the challenging side was a lack of defined problem statement – which led to a very broad initial exploration and a long problem-finding phase. Eventually, however, this partnership yielded a unique opportunity to work with Street Lab.

Another challenge was the DDC's focus on the private sector. As their primary focus is to promote design in Danish industry, it was important to them that the private sector was never completely dropped from solution development. This had the positive effect of forcing me to take a more inclusive view of the definition of 'diverse urban stakeholder' – keeping solutions open to the private sector as well as citizens, and considering actors I would perhaps otherwise have overlooked (for example, the cafes and small businesses lining Vester Voldgade).

This partnership provided me with a level of access to Street Lab that would otherwise have been impossible. Not only did the DDC first suggest I apply my research to the Street Lab project, throughout the solution development process, the DDC also acted as a gatekeeper, helping to pass on information and set up workshops and interviews with the CSL.

Christian Villum, my main contact at the DDC, also provided valuable supervision throughout the process, both in person and over email. The DDC has also offered a valuable platform on which to share my process and results, in the form of a public blog post (currently under development).



## TESTING

Almost every design process can be improved in some way, and this thesis is no exception. In this case, the high workload involved in the artifact creation process, coupled with the fact that I was working somewhat as an 'uninvited consultant' (and therefore not authorized to test Street Lab initiatives in the area), led to a lack of testing. The service concepts suggested are for the most part purely conceptual, guided by citizen research and feedback from the DDC and CSL but not feedback from diverse urban stakeholders themselves.

This is an acknowledged weakness – but due to the focus of the work here, ie. influencing the priorities of Street Lab's governing stakeholders with information, vision and tools (not providing polished service concepts), not one that undermines its relevance.

One note is that the inclusion toolkit is in fact designed to be tested and iterated, but due to a limited timeframe, this falls outside the scope of this thesis. The toolkit will be open for access, allowing the testing and improving process to occur in the future, in the hands of actual users.

# *Reflection on Design Activism*

Taking a design activism approach with this thesis was a radical departure from my previous service design work.

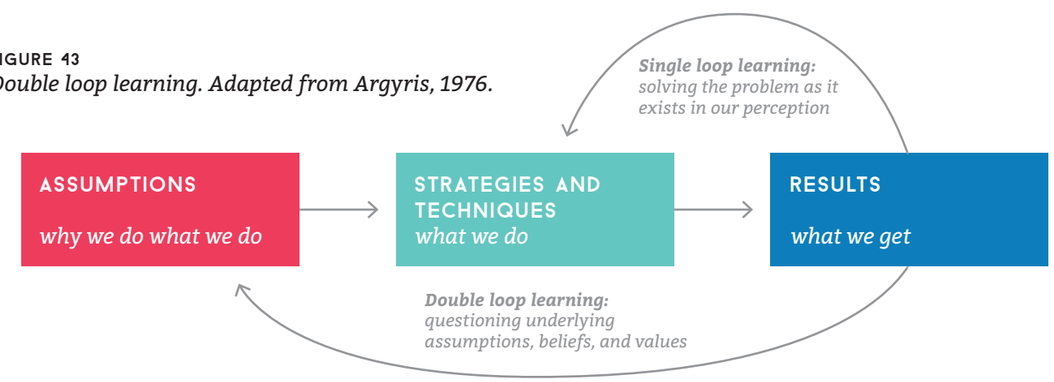
As discussed, I felt that this approach made sense given the circumstances of the problem statement – a tangible and immediately relevant issue which I felt was important enough to try and make a real impact on solving.

The design activism practiced here involved producing incremental, iterative artifacts which built upon each other in attempt to influence decision-making actors. It worked well in that with each new deliverable/artifact, the DDC and CSL became more engaged in my process. With each new round of feedback, I learned more about the complex network of stakeholders and motivations surrounding Street Lab, and was able to build this into subsequent artifacts.

This way of working fits the theoretical framework 'double loop learning' (Putnam, 2014). As the artifacts of design activism were introduced, the insight gathered from feedback was disruptive enough to force me to reconsider whether they were, in fact, the artifact type best suited to accomplish the project goal. Instead of going back and iteratively improving any of the artifacts, a careful assessment of each new round of information resulted in the design of totally different, better-fitting solutions (Figure 43).

Some unique challenges accompanied the design activism approach. Firstly, the process was extremely labour intensive. As the artifacts were being produced mostly for a stakeholder who had not actively consented to be part of the process (the CSL), much effort was made to make them visually appealing and engaging. On top of the research, ideation, and synthesis required for the various artifacts, a high level of visual design was also required to present the work.

FIGURE 43
*Double loop learning. Adapted from Argyris, 1976.*



Another challenge was that the artifacts were produced without any certainty that they would have the correct effect, which resulted in a high level of uncertainty throughout the process. This uncertainty made it hard to manage time, and added stress to the design process.

Finally, I found that the impact of the design activism process was difficult to observe and measure – at least on this short time scale. Considering and devising an assessment scale before beginning the design activism process may have been beneficial here, and is something to consider for future acts of design activism.

As an approach to design, I believe that design activism has great potential. When actors are presented with a concrete, well-described vision of what the future could be like, my experience with this process has been that they tend to immediately begin actively analysing that future. Even if they are not in agreement with all elements presented, this seems to have a mobilizing effect.

Interest is also built up among actors about the design process itself. When presenting my solution roadmap, the CSL became interested in how I gathered my design research, resulting eventually in my creation of a simple design research toolkit. By promoting the design process, design activism had the positive effect of promoting user-centredness.

There is little written about design activism. Apart from the works cited in this thesis, its presence in academic literature is underdeveloped. I hope that as 'design' as an academic discipline develops, design activism is further explored – as in my experience, it is a powerful tool with great potential.

# The Role of Service Design

*This project pushed the boundaries, for me, of service design's role.*

Within previous projects, I have used service design tools to identify and solve a visible, concrete problems. In this case, however, service design was used with a much more subtle aim – that of shifting perception. Though the same methods and tools were used, instead of creating a final service concept, the process itself comprised the major act of design.

The role of the service designer themselves becomes extremely influential in this process. As the one describing an influential vision of how things could be, the designer has unique power to shape the future. There is a large degree of responsibility on the designer for ensuring that the vision they are describing aligns with the needs and wants of the people who will inhabit it.

I believe service designers in particular are well-suited to this task, due to a dichotomous skillset. Service design's strong focus on user-centred, co-created design – and the arsenal of tools to accomplish this – are essential in ensuring that any artifacts created align with target users. But service designers are also designers, and as such focussed on being proactive, developing solutions, innovating and inspiring innovation.

In the words of associate design professor at the Politecnico di Milano, Anna Meroni (speaking in a workshop on social innovation at Aalborg University, May 2016) "the very essence of being a designer is being proactive – proposing solutions... we have to be inspiring to social innovators".

# Final Words

To conclude, I would like to stress the excitement I often felt while working on this thesis. Working to change how things work in the real world is a powerful feeling, and I was motivated by a conviction that this work is important. There is much to be done with regard to improving our cities, and to me this is Service Design at its most inspiring.

# *Works Cited*


Allen, D., Colligan, D., Finnie, A., & Kern, T. (2000). Trust, power and interorganizational information systems: the case of the electronic trading community TransLease. *Information Systems*, 10 (Information Systems Journal), 21–40.

Almirall, E. (2008). Living Labs and open innovation: roles and applicability. *The Electronic Journal for Virtual Organizations and Networks*, 10, 21–26.

Argyris, C. (1976). Single-loop and double-loop models in research on decision making. *Administrative science quarterly*, 363-375.

Baccarne, B., Schuurman, D., Mechant, P., & De Marez, L. (2014). The role of Urban Living Labs in a Smart City. *XXV ISPIM Conference*, (June), 1–14.

[2] Baccarne, B., Mechant, P., Schuurman, D., De Marez, L., & Colpaert, P. (2014). Urban socio-technical innovations with and by citizens. *Interdisciplinary Studies Journal*, 3(4), 143.

Bergvall-Kareborn, B., Eriksson, C. I., & Ståhlbröst, A. (2015). Stakeholders in Smart City Living Lab Processes. *Proceedings of the 21st Americas Conference on Information Systems* (AMCIS 2015), 1–11.

Borglund, E. (2014). Open data?. *Records management journal*, 24(2), 180-163.

Buurman, R. D. (1997) User-centred design of smart products. *Ergonomics*, 40:10, 1159-1169

Buss, T. F., Redburn, F. S., & Guo, K. (2014). *Modernizing Democracy: Innovations in Citizen Participation*. Armonk, GB: Routledge.

British Design Council (2005). *The Design Process: The 'Double Diamond' Design Process Model*. Retrieved February 15, 2016, from http://www.designcouncil.org.uk/sites/default/files/asset/document/ElevenLessons_Design_Council%20(2).pdf

Carrasco, C., & Sobrepere, X. (2015). Open Government Data: An Assessment of the Spanish Municipal Situation. *Social Science Computer Review*, 33(5), 631-644.

Castells, M. (2012). *Networks of Outrage and Hope: Social Movements in the Internet Age*. Berkeley, CA, USA: University of California.

Coghlan, D., & Brannick, T. (2014). *Doing action research in your own organization*. SAGE Publications Ltd.

DDC (1). About Us. *Danish Design Centre's Website*. Retrieved June 13, 2016, from http://ddc.dk/en/about-ddc/

DDC (2). DesignCities. *Danish Design Centre's Website*. Retrieved February 05, 2016, from http://ddc.dk/en/platforms/designcities/

De Lange, M., & de Waal, M. (2013). Owning the city: new media and citizen engagement in urban design. *First Monday*, 18(11).

Denzin, N. K., & Lincoln, Y. S. (2011). *The SAGE handbook of qualitative research* (4th ed.). Thousand Oaks, CA: Sage.

ENoLL (European Network of Open Living Labs) FAQ. (n.d.). Retrieved April 05, 2016, from http://www.openlivinglabs.eu/

Eskelinen, J., Lindy, I., Marsh, J., & Muente-kunigami, A. (2015). Citizen-Driven Innovation – A Guidebook for City Mayors and Public Administrators. World Bank and ENoLL.

Foth, M. (2009). *Handbook of research on urban informatics: The practice and promise of the real-time city*. Hershey, PA: IGI Global.

Fuad-Luke, A. (2009). *Design Activism: Beautiful Strangeness for Sustainable World*. Sterling: VA. Earthscan.

Gorman, G. E., Clayton, P. R., Rice-Lively, M. L., & Gorman, L. (1997). *Qualitative research for the information professional: a practical handbook*. London: Library Association Publishing.

Guba, E. G. (Ed.). (1990). *The paradigm dialoge*. Sage Publications.

Hammersley, M. (1990) *Reading Ethnographic Research: A Critical Guide*, London: Longmans.

Hammersley, M. (1992) *What's Wrong with Ethnography? Methodological Explorations*, London: Routledge.

IDEO. (n.d.) *How Might We*. Retrieved August 04, 2016, from http://www.designkit.org/methods/3

ISO/IEC. (2010). ISO 9241-210:2010 – *Human-centred design for interactive systems*. Geneva, Switzerland: International Organization for Standardization (ISO). Retrieved March 24, 2016, from www.iso.org/iso/catalogue_detail.htm?csnumber=52075

Johannesson, P., & Perjons, E. (2014). *An Introduction To Design Science*. Springer International Publishing Switzerland.

Lopez, M. (2008). Interview techniques. In S. Boslaugh (Ed.), *Encyclopedia of epidemiology* (Vol. 2, pp. 565-566). Thousand Oaks, CA: SAGE Publications Ltd.

Markussen, T. (2013). The disruptive aesthetics of design activism: Enacting design between art and politics. *Design Issues*, 29(1), 38–50.

Mikael, M. F. (2008, June 9). Sacrificial Concepts. Retrieved August 09, 2016, from design-thinking.blogspot.dk/2008/07/sacrificial-concepts.html

Moritz, S. (2005). *Service design: Practical access to an evolving field*. MSc thesis, KISD.

Mosannenzadeh, F., & Vettorato, D. (2014). Defining Smart City. A Conceptual Framework Based on Keyword Analysis. Tema. *Journal of Land Use, Mobility and Environment.*

Mulgan, G., Tucker, S., Ali, R., & Sanders, B. (2007). Social Innovation: What it is, Why it Matters and How it can be Accelerated. Said Business School, Oxford.

Munthe-Kaas, P. (2015). Agonism and co-design of urban spaces. *Urban Research & Practice*, 8(2), 218-237.

Nam, T., & Pardo, T. A. (2011, June). Conceptualizing smart city with dimensions of technology, people, and institutions. In *Proceedings of the 12th Annual International Digital Government Research Conference: Digital Government Innovation in Challenging Times* (pp. 282-291). ACM.

Niitamo, V., & Kulkki, S. (2006). State-of-the-art and good practice in the field of living labs. In *Proceedings of the 12th International Conference on Concurrent Enterprising: Innovative Products and Services through Collaborative Networks*, Milan, Italy. (pp.349-357).

Paskaleva, K. A. (2011). The smart city: A nexus for open innovation? *Intelligent Buildings International*, 3(3), 153-171.

Putnam, R. (2014). Double-loop learning. In D. Coghlan & M. Brydon-Miller (Eds.), *The SAGE encyclopedia of action research* (Vol. 2, pp. 284-284). Thousand Oaks, CA: SAGE Publications Ltd.

Reason, P. & Bradbury, H. (Eds.) (2008). *The SAGE Handbook of Action Research*. SAGE Publications Ltd.

Schuurman, D., Lievens, B., De Marez, L., & Ballon, P. (2012). Towards optimal user involvement in innovation processes: A panel-centered Living Lab-approach. In *Proceedings of PICMET'12* (pp. 2046–2054).

Scrum Alliance (2016). *What is Scrum? An Agile Framework for Completing Complex Projects*. Scrum Alliance. Retrieved 13 June 2016.

Sein M. K., Henfridsson O., Purao S., Rossi M. and Lindgren R. (2011) Action design research. *MIS Quarterly* 35(1), 37–56.

Service Design. (Last edit March 14, 2016). In *Wikipedia*. Retrieved March 24, 2016, from https://en.wikipedia.org/wiki/Service_design

Silverman, D. (2005). *Doing qualitative research: A practical handbook (2nd ed.)*. SAGE Publications Limited.

Stake, R. E. (1995). *The art of case study research*. Sage.

Stickdorn, M., & Schneider, J. (2011). *This is Service Design Thinking: Basics, Tools, Cases*. Hoboken, NJ: BIS.

Thomas, V., Wang, D., Mullagh, L., & Dunn, N. (2016). Where's Wally? In Search of Citizen Perspectives on the Smart City. *Sustainability*, 8(3), 207.

Thompson, R. (2002). Stakeholder Analysis: Winning Support for Your Projects. Retrieved August 04, 2016, from www.mindtools.com/pages/article/newPPM_07.htm

Ubaldi, B. (2013). *Open government data: towards empirical analysis of open government data initiatives*. OECD Working Papers on Public Governance, No. 22, OECD Publishing. Retrieved February 15, 2016, from http://dx.doi.org/10.1787/5k46bj4f03s7-en

Veeckman, C., & Shenja van, d. G. (2015). The city as living laboratory: Empowering citizens with the citadel toolkit. *Technology Innovation Management Review*, 5(3), 6-17.

# APPENDIXES

## APPENDIX A:

*Peter Munthe-Kaas, interview transcript.*

*Date & time: March 3, 12:00 pm*

*Location: Aalborg University CPH Canteen*

*What is Copenhagen's strategy for citizen inclusion in urban planning - very broadly?*

The Copenhagen strategy? Actually they just made a new strategy. Its called 'sammen om byen', in Danish. I think it's probably translated into 'Copenhagen Together'. Almost everything does these days. So, that's like a 5-point strategy for better dialogue with citizens in the whole of the municipality. Its very very broad, and very much on the vision level and probably won't lead to that much change if I am to judge it – because there's no money for it and even though it has been up in the, what do you call it, city council, it probably won't be effectuated because there's no specific goals in it.

*So what are the main points within it?*

It says more citizen inclusion, earlier citizen inclusion, it says more diverse inclusion, it's very focussed on the citizens, basically – on what citizens can expect, which is what I find challenging in it, it's very focussed on the citizen's side.

*Ok, and not on what the municipality should do themselves?*

Yea, not what the planners can actually use it for, which is what I'm mainly working with. My whole point is that it doesn't make sense to include anyone, if the inclusion isn't going to lead to anything. And a lot, really really a lot, of citizen inclusion is doing exactly that. It's inclusion for inclusion's sake – and that's sort of meaningful, in a democratic way, but working with innovation and urban development and all that stuff it doesn't make any sense at all to include someone just to include them. It's just a waste of time.

*What are you doing to change that?*

Well I'm very focussed on getting the planners to analyze and work with while they're doing it. So, to put it very simply, I keep telling them to ask the question "why are we doing this?" before they start doing anything. And don't do it, if it doesn't make sense for them. So constantly sort of, focussing on why are we doing these processes, instead of seeing it as something that they have to do or something they're being forced to do, which often happens.

*Is this the first time they've asked themselves that kind of thing?*

Of course not – they've been doing that for years in many departments, it's a very big municipality and very diverse, so some people are really really good at inclusion processes and have been doing it and using it actively for years. But a lot of places they're still finding it hard. Mainly, I think, because inclusion is still stuck in the idea of the citizen meeting, or the hearing. So, where you gather a lot of citizens in a room and then you tell them what your plans are and then they ask questions or complain. That model just is very rarely useful, it very rarely leads to anything constructive or positive. The idea of that being citizen inclusion give the whole potentiality of inclusive processes a bad reputation.

*Are they exploring other channels?*

Oh yea, there's a lot of interest in alternative methods these days.

*Yea, I've seen your 'skab din by' project, and visited the Climate Quarter. Is there more of that going on?*

Yea, its still not common or normal in all urban development projects, but you see quite a lot of it now. There's Nordre Frihavnsgade in Østerbro has had a large inclusion process recently, where they placed a container in the middle of the street and had a lot of dialogue going around there. I think someone actually had their office there.

*So there was more face to face, on the citizen's own time?*

Yea, and then there's all the urban renewal projects that have been there for years, of course, and have a completely different perspective on inclusion – much more on the citizen's level, and much more co-creative. The Climate Quarter is just one of them. I'm working with a project called the Gold Mine right now. It's a prototypical experiment on a recycling station.

*Oh yea, I've heard of that one.*

Yea, I've done two, actually, we also did one in 'Skab din By' about a recycling station. But this is a two year project, where twelve small start-up companies get to stay in this industrial hall next to a recycling station and they get to use the trash that gets thrown out. They get access to the containers, and they get to start to build businesses around that. They get to do that because they at the same time are helping the

municipality to understand more about what can be directly reused from the recycling stations.

*How did you find the startups?*

There was an open call from the municipality. So that's more into a co-creative, co-development sort of vibe. And that's still quite uncommon, I would say, to strategically develop the services and physical spaces in the city in that way, so close to citizens.

*Ok. What about digital channels, are there any being used to for citizen inclusion?*

I guess the big ones in Copenhagen right now would be 'Bliv Hjørt', which is the hearing channel. All hearings that have to go out.

*So anytime there's a public hearing, you can stream it.*

Yea, its not like a stream, you get the question asked and then you can write something, like an online chat or an open mailing system.

*Is it used a lot?*

Yea, but mostly by organizations. The elderly council, and the local councils, and stuff like that that are very attentive to those channels. I would say that normal citizens are not, really. Also because it requires some work to go in there and read all the material before you can answer the questions.

*Do you also have to make an account?*

I don't know – I haven't tried. Apart from that I guess they're working a lot with facebook in many different places. But it's still not really organized is my feeling. There's a lot of local organizations and institutions in the municipality that are starting to use facebook in one way or another but there's not that much coordinated facebook activity. Of course the municipality of Copenhagen has a facebook, but I think that is mostly used for getting information out and not for dialogue.

*Are businesses involved at all in the inclusion process?*

More and more, I think. At least in the technical administration, where I do most of my work, they've gone from talking about citizen inclusion to inclusion of the surrounding world. 'Playing together' with the surrounding world, it's called now. So it's a much broader definition of inclusion than just citizen inclusion. There's more actors involved. In particular businesses seem to be getting more and more. Of course, businesses have always been involved in some way in the municipal development. But I think small businesses are increasingly involved now, where as usually it would be the big entrepreneurs and developers.

*Yea. Practically how does this work? Discussions, or..*

Hmm, I haven't actually been involved in that many of those processes. I think that often it's around projects, so if you're a developing some part of the city or trying to create something new you'll go into partnerships – so that's probably the word you should focus on. At least that's very popular in the municipality right now. Do something in the city together with some businesses, instead of just doing it as the municipality. Support the start-ups and create some growth while doing what you're supposed to do anyway. That also goes on a cultural area, like the cultural houses and the big cultural events in Copenhagen are also partnerships with all sorts of businesses.

*Are there certain groups that are harder to reach?*

In general? Classically, everyone who has a different ethnic background than Danish are excluded from these processes a lot. Young people are rarely participating. Children and families with children generally have a harder time coming, so mostly its semi-elderly people who participate still. At least if you're talking about traditional forms of inclusion.

*And have you noticed that with these newer methods of inclusion, these more co-creative processes that these other people come out more?*

Yea. Definitely. But maybe more interestingly, there seems to be a slight move away from 'representativeness'. It was important for planners that the participants were representative of the citizens, in some way, in general – a legitimizing perspective on inclusion. Many of the people I'm working with are going away from that and more into getting something useful out of the inclusion. If you want to do that, it's more about seeing diversity. Seeing the different perspectives, rather trying to get someone to represent the whole group, which is more of a consensus perspective.

*So what you're saying is, seeking out these diverse perspectives?*

Yea. There's also something with a shift from wanting the ideas of the citizens, or again wanting them to represent and make decisions, which was sort of the older, democratic perspective on citizen inclusion, and moving more into an idea of gaining knowledge by talking to citizens. So understanding something more. So more of an anthropological perspective on the inclusion.



*In your opinion, why is citizen inclusion important?*

Well, it's important for many different reasons. The way I work with it right now, is that in an increasingly complex city it's impossible to do your work properly without understanding the ones you're working for. Which is the citizens, or at least the surrounding world – the broad definition of citizens, including businesses, 'actors' if you want. If you're not able to understand the needs you're simply not able to plan a city that makes sense to live and work and make businesses in. So for me, it's sort of self evident that you have to understand the people out there and you're not able to do that by just analyzing and making models as you might want to do if you're a rationalistic planner. You need to actually engage with people. Also because, at least I find it interesting, it seems to me that we can make a better city if we start to work more co-creatively. There's a lot of work to be done there – to move from what I said before, the perspective of going out there to understand the citizens, and then bringing the knowledge back. Then still planning, formal planning, expert planning. And going more into this partnership mode or co-creative mode where you actually develop the project with the citizens as you go along, where they get more influence on what's actually produced and the planners open up for actually changing themselves and the way they work. I think the more traditional perspective would be that you might change the project out there, a little bit, after talking to citizens, but you're not going to change the way you work with developing the city. There might be a bit more openness now, for looking a bit more inward as well and saying 'ok well, maybe we need to find some completely new ways of developing the city, of budgeting, for example'.

*Completely new as in, much more linked with the people living in the city?*

Yea, and connecting to what's actually going on out there. There's some very interesting talk about the budgeting, for example, when you make new urban spaces. Many planners have realized that the use is never as imagined when you make a new urban space, so maybe it makes sense to have some money to recreate the space after you see how it's used.

*Like customize it to the people who are actually using it?*

Yea, just slightly change it or connect it to the context in use. And right now there's very rarely money for that, that goes into the everyday budgeting of cleaning and stuff like that. So it's very hard to make those often very necessary and potentially very valuable changes. So I think there's a chance that we'll see just 5-10% of budgets for some new urban spaces will be dedicated to the redesign, or design after design of these spaces. At least I would find that very interesting, and there's some talk about it.

*How do you find the engagement of the citizens? How do you get them to be interested in these kinds of processes?*

That's very hard to say. It depends very much on the process, and that's maybe the most important point, that you can't generalize too much about these things. People are very different, and they're interested by very different reasons. And again, I always return to 'what does the planner need?', why is it interesting for you, before I go down into why is it interesting for the citizens to participate. You need to know why you want them to participate first, and what you need from them. Do you want them to come into the process and co-create with you? Well, then you need to use some methods. If you only want to go out there and understand them, and see what they're like or how they might react to something, well then it's probably easier to just send out an anthropologist or go out there and do some observations or whatever. And if you just want to inform them about something you're going to do, because you know you're going to do it and it's not going to change, well then you shouldn't begin talking about inclusion. You actually don't want to include anyone.

*In specifically the co-creation instances, what has your experience been?*

I think that a really important thing is that you can't be too clear about the structure, about what and how things are going to be used. Especially the translations from the process into the formal planning system can be quite hard to deal with. Because in practice even the simplest co-creation methods that were popular like ten years ago, like those post-it workshops where people would brainstorm ideas for something (in practice I'm not sure if you should actually call that co-creation, but it has some sort of vibe of that) how do you get 1000 post-its translated into a planning document? That's very often impossible. Not a lot of research has been done on it, but my feeling is that very little is actually translated, at least specifically from the post-its into the plans. Maybe the planners get some inspiration from something that goes into the plans, but very often it stays at the workshop, because it's too hard to translate.

*Even in the more modern processes?*

The big difference when you go into the prototypical space that me, among others, have been working with is that you start to mobilize

something with them. Something actually happens with the city. People start to change their attitudes and approaches to the project on a larger scale than when coming to a workshop, is my feeling.

*So the physical act of building something in the space?*

Yea, or just meeting something in the space. I've been talking about it before as seeing the same thing. Even though you don't like it, or it's not pretty because it's a prototype, everyone actually sees and touches the same thing out there. Where as in many of these meeting type situations, people have a tendency of projecting their own perspective onto the project. So you might be angry about or concerned about that this recycling station will leave a lot of trash on the street, and you really want to talk about that for a whole meeting because I'm not able to convince you that that won't happen because I'm projecting an idea of cleanliness – and we're not able to connect. Often people are not able to connect about that, in a meeting situation, but when you actually see the prototypical recycling station, then we have a completely different conversation.

*So the key is actually going there and being there.*

Yea, and rehearsing, you could say. The people from the co-design cluster in the danish design school have talked about this as 'rehearsing the future', quite a nice term I think. So these projects start to build the infrastructure for the future, because they go in and they intervene in urban space, and change the way that the different actors are able to relate with each other in practice. In a much more realistic and complete way than a meeting situation, which can also stage something or intervene, but often doesn't have the same sort of mobilizing effect. Also just because of time in many cases, because of course a prototype that is in place for many months will do something completely different than a workshop for a few hours.

In your opinion, what do you think of including more digital channels in this process?

There are opportunities there, but it's a bit of a dangerous field, I would say. A lot of projects have tried and failed and often these projects are quite expensive. It's sort of the danger of building the 'perfect portal'. Many of these projects, at least the ones that get really expensive, are trying to build the one system to rule them all – the one citizen inclusion system that will be perfect. Nobody's really managed, at least so far, to create the critical mass around their project that makes it interesting. Right now the only place where you can get enough people to use anything is Facebook. All other channels are close to dead. So, I think you need to think very carefully about how you do it and who your target group are when you do these things. In some cases it can make sense to do something local around the specific project, but then you have to mobilize the community that are going to use it and get them to use it, make it interesting for them to use it. So I feel that there are potentials, but I'm also distancing myself from it. It's really a lot of work to make these things. I know some people who are working on large-scale citizen inclusion systems for a climate adaptation project, but I'm a little bit sceptical towards getting people to use it.

*Ok, so in your opinion you can translate the co-creation atmosphere into a digital space – or do you lose something?*

Of course you lose something when you go away from the physical world, but I think you can potentially do a lot of interesting stuff online. People do project co-ordination all the time online on all sorts of platforms, and of course you can do that with citizens as well to some degree. What we did in create your city was quite interesting, where we instead of asking people for their ideas for the city, which is what very often happens – and which is very often useless because nobody cares – we asked about the good places in the city for something. So, the best place to play in the city or the nicest quiet spot in the city. So that was more to gain some sort of understanding of how the city is experienced and what qualities people experienced in it. I found that the answers were more interesting. That can also be a problem with online tools.. That someone has to sit in the other end and actually read these answers and answer questions and stuff as well, and that takes a lot of work. But it doesn't make any sense if there's no one there to actually receive all this information that's coming in. But there's a lot of municipalities that have started to use Facebook in one way or another, and there's a lot of different experiences with that. I've heard some people say that it's been great – so much knowledge and information, and such a nice dialogue, and other places it's been a catastrophe and the planners have hated it and there's so much conflict and stuff like that.

*And what's the difference between those two cases?*

Well my feeling is that it has nothing to do with the medium, it has to do with the situation which is being – as it often is – blamed on the inclusion process. On the method, instead of the planners looking into what is the problem here. Apparently someone is angry here, and that has nothing to do with facebook. Of course that mediates it in a new way, but it has something to do with a controversy in the city. Often the planners that like to work with these controversies, or at least recognize that controversy is a part of the city that they have to deal with, are very much better suited to work with citizen inclusion because they want to work with reality. Whereas the ones who try to avoid the conflicts or create consensus all the time have a very hard time dealing with citizen inclusion processes because all they realize is that the situation is more complex than they thought. That gets very frustrating for them because they want one answer, but then they get 100 answers and they're not able to deal with it.

*So it's better to somehow mediate all these different opinions and then come up with something?*

Well, at least from my perspective, that's what's there. You need to deal with what's actually out there in the city, instead of trying to deal with what you imagine should be there. The city will always be controversial, and nobody will ever agree on anything, and your job is to mediate as a planner. And also the important point that if you allow the citizens to meet each other in that, you also avoid one of the bigger problems in this field of inclusion which is that the planners tend to feel like they always get the blame. No matter what they're doing – the bicyclists tell them that they're idiots because there's too many cars, and the people driving cars blame them for removing parking spots, at the same time. And for the planners that can often feel like an impossible situation, because they want different things and they're contradictory. But what they then do wrong, as I see it, is they then try to be good public servants and talk to these groups individually, instead of letting these interest groups meet each other and have a conversation where they can see 'oh, it's not the planner who's an idiot here – it's actually different interests around the city'. And then allowing the citizens or these interest groups to talk it out in some way. Of course they'll never agree either, but then at least they'll see each other.

*Ok – and then at least the blame won't be on the planner. But does that work?*

I've seen it happen in some of these prototypical processes in smaller urban spaces. Someone wants a bench where they can sit and drink beer, as they've been doing for years, and someone wants a nice quiet park, and when they meet each other they tend to at least recognize that they have different needs. And often that these people drinking beer on the benches aren't that problematic, actually – they're not dangerous, and they're quite nice when you talk to them. So you also can create some sort of new social cohesion in neighborhoods by doing this. And sometimes of course it's possible to go into a project process where you agree on making something. You'll always exclude some interests in those processes, but my feeling is that it's possible to co-ordinate interests as well. It's not like one group will get what they want and everyone else will be excluded, a lot of different interests can be combined in an urban planning project. But there will always be some exclusions, no matter what.

*Ok – that's us out of time. Thank you so much!*

# APPENDIX B:

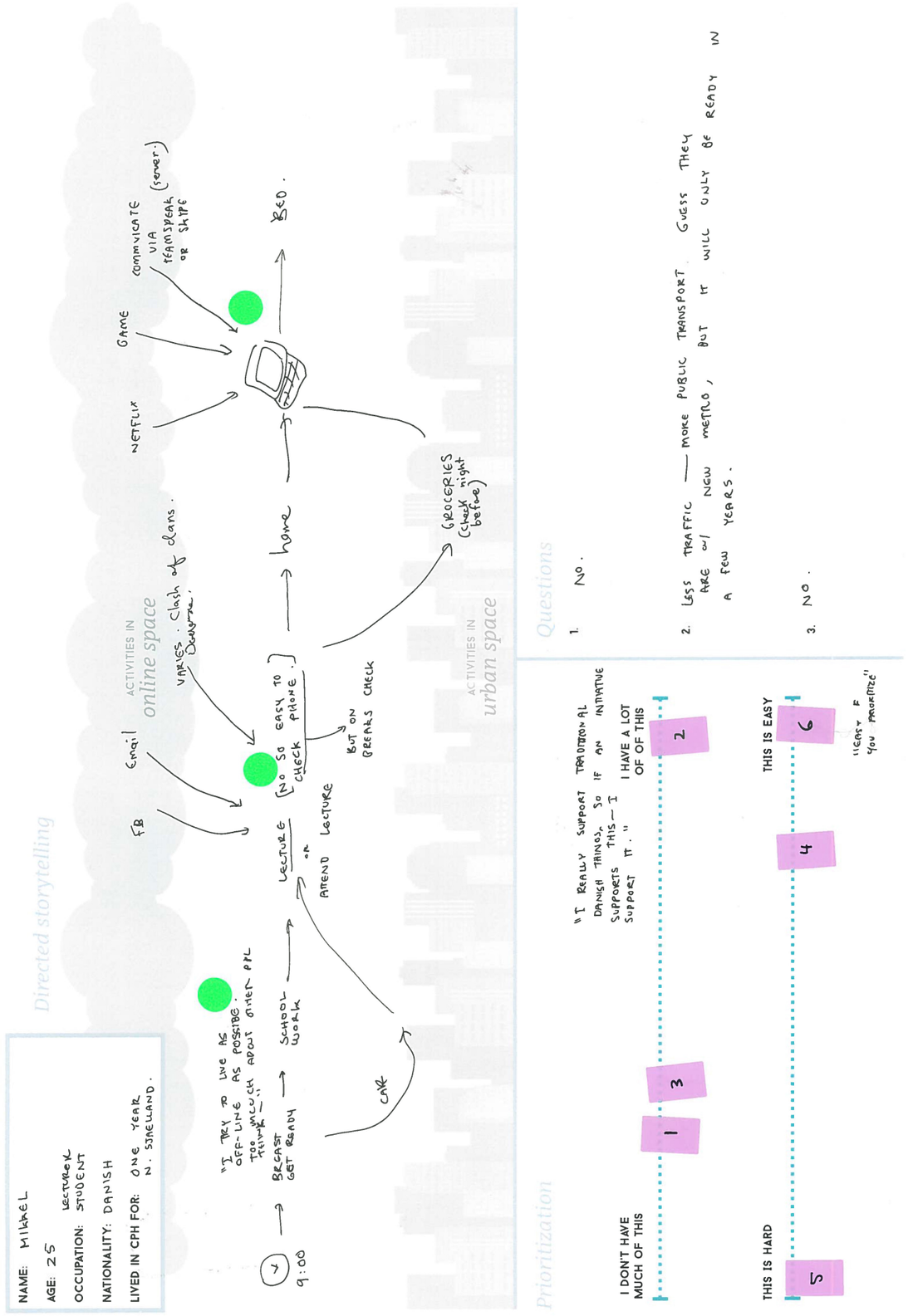
*Selected citizen worksheets.*

*Date & time: March 14-15, 10 am - 2 pm*

*Location: Aalborg University CPH Canteen & ITU Entrance hall*

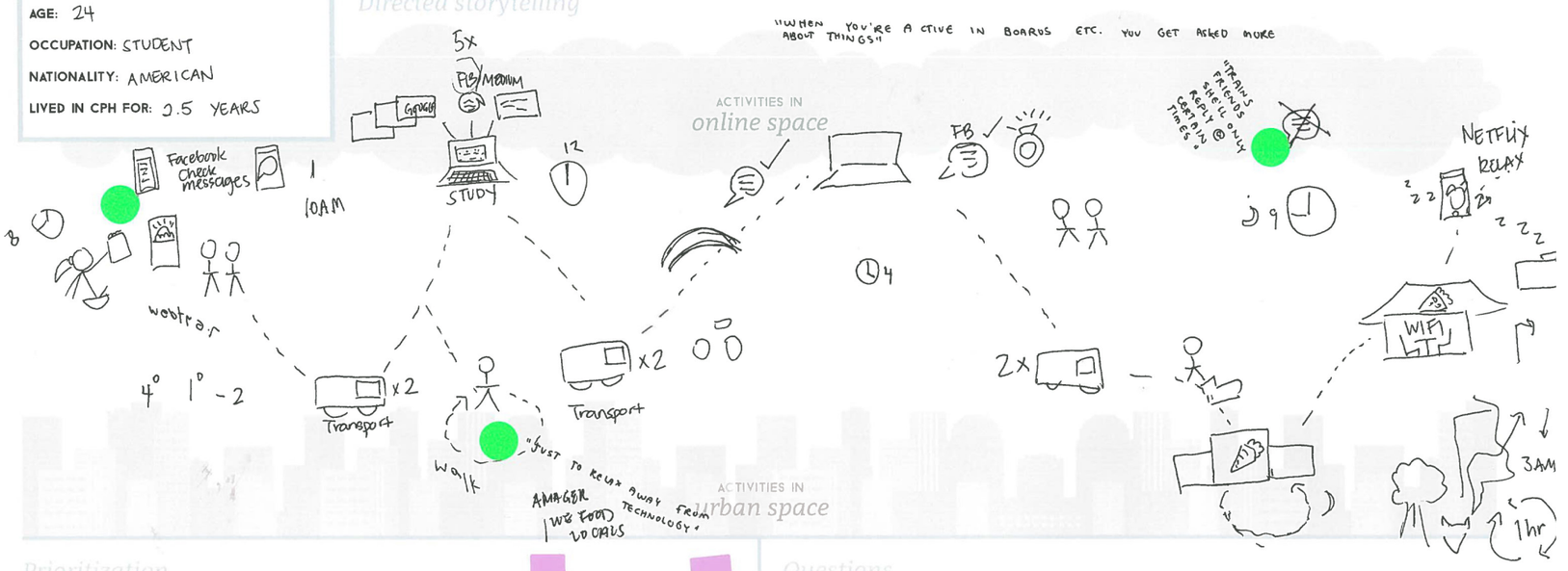
The following are a selection of scanned citizen worksheet samples. In the interests of space, not every worksheet has been included here – only some examples deemed most interesting.



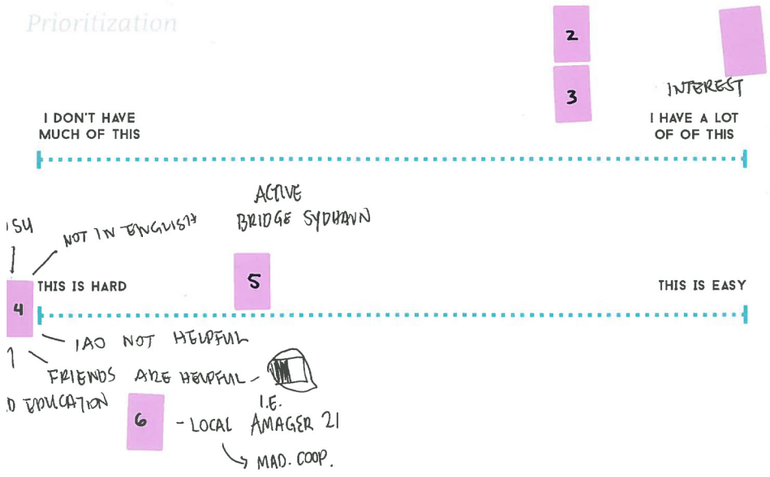


NAME: RINA YAHYA
AGE: 24
OCCUPATION: STUDENT
NATIONALITY: AMERICAN
LIVED IN CPH FOR: 2.5 YEARS

## Directed storytelling




## Prioritization




## Questions

1. No . No .

2. INVEST IN THE TALENT COMING — @ Least 2-3 years. Jobs / accomodation (Yes biased) Educated, Small problem w/ a group, can apply to bigger pop.

NETWORK — real, engaged network that want to help you. Not "fend for yourself". The further you are away, the longer it is.

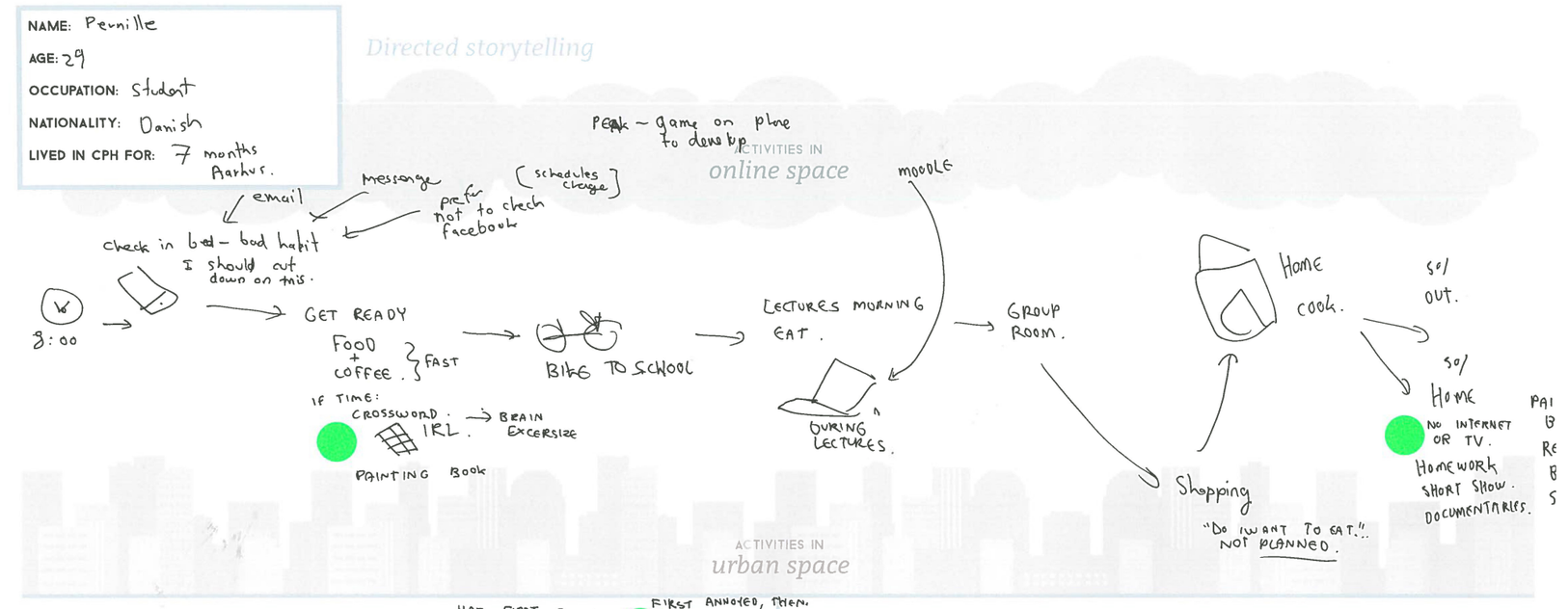
3. (ADVANTAGE of system.) Differentiate by excellence. Prove you want to stay here. Terrible job of retaining, good job of attracting. Only waitressing, only menial jobs.

YES. Smile. Realized bad problem — talked to boards/

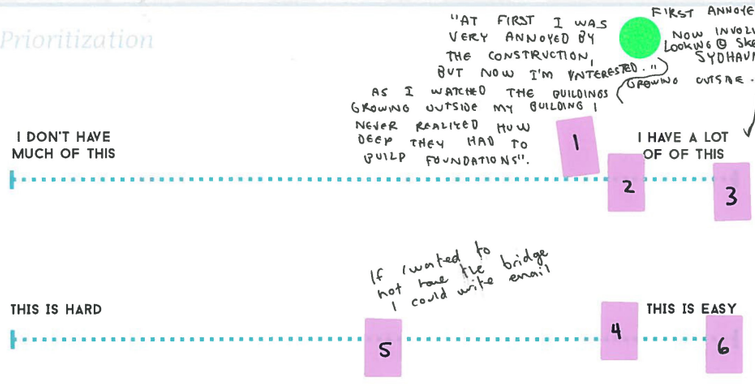


NAME: Pernille
AGE: 29
OCCUPATION: Student
NATIONALITY: Danish
LIVED IN CPH FOR: 7 months Aarhus.

## Directed storytelling




## Prioritization




## Questions

INTERESTING TO SEE BUILDINGS GROW, & SEE HOW DEEP THEY BUILD THE FOUNDATION, ETC.

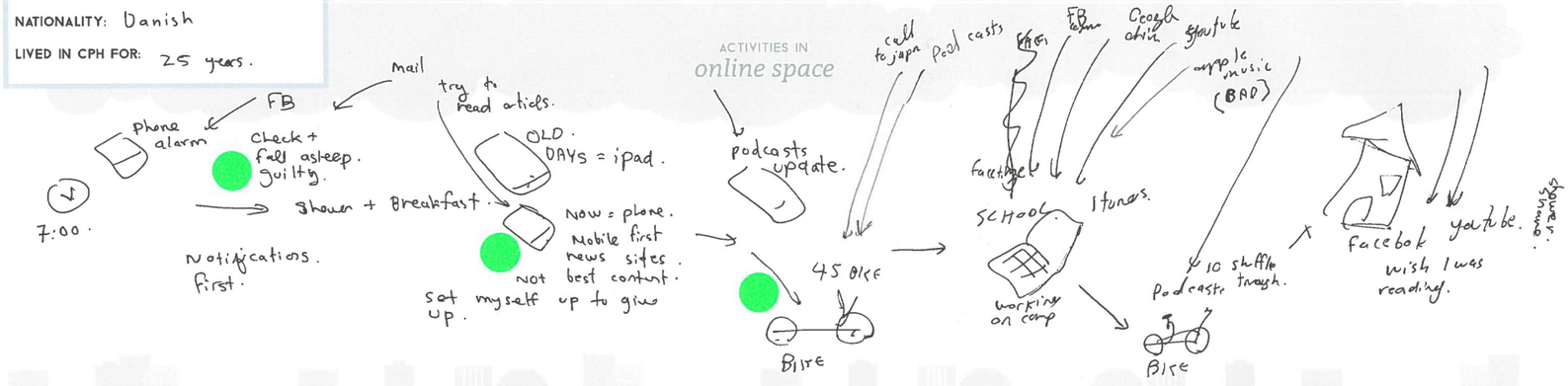
1. NO .

2. keep the green areas in the city + make an effort to clean.
keep buildings not to tall. Sun won't be shaded off — Sun. Might not think abot it.

3. Should have been @ somewhere yesterday.
Yesterday = kickoff for urban workshops.

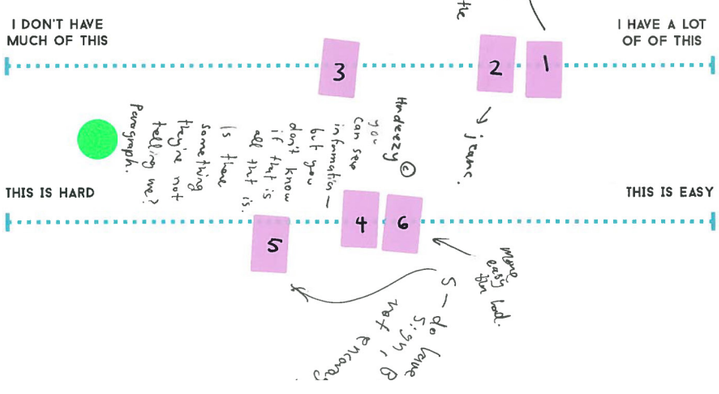
NAME: Esben.
AGE: 27
OCCUPATION: Student
NATIONALITY: Danish
LIVED IN CPH FOR: 25 years.

## Directed storytelling




ACTIVITIES IN urban space

## Prioritization




## Questions

1. YES. NO/maybe. Not aware of it.
Can't identify it → google maps maybe. Not conciously.

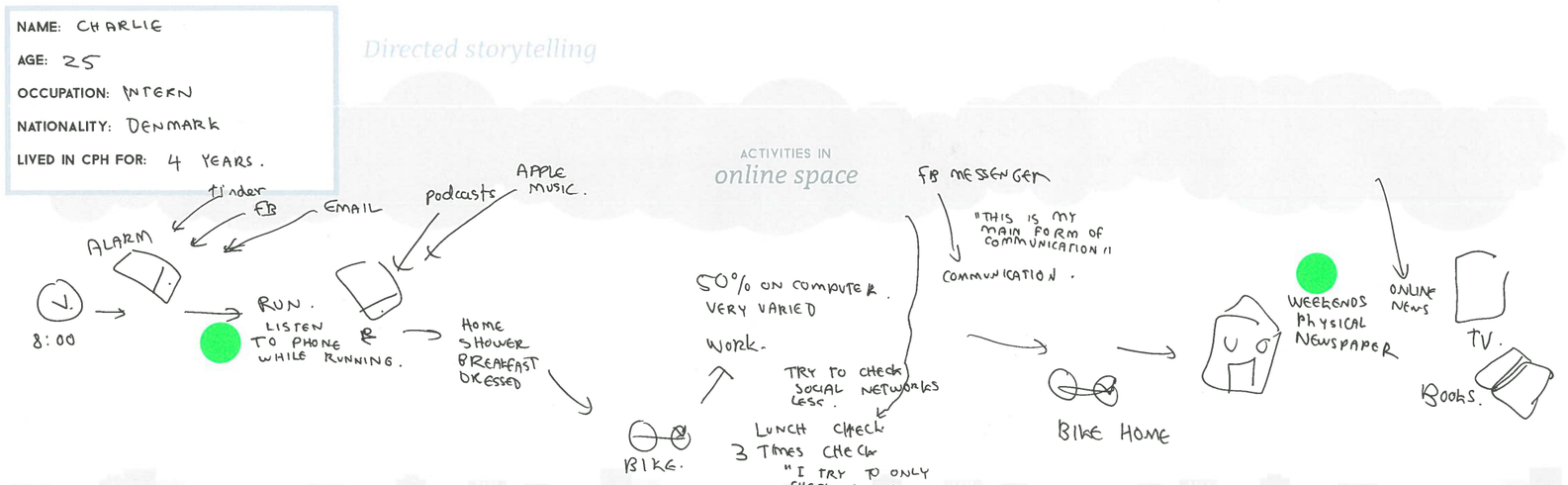
2. HARDER FOCUS ON KEEPING CARS OUT. CAN-DO ATTITUDE. More like "this is happening." If you want to be serious about bike town go for gold.

3. I'm not being a disruptive fellow. Co-creating if following Society's code.
People



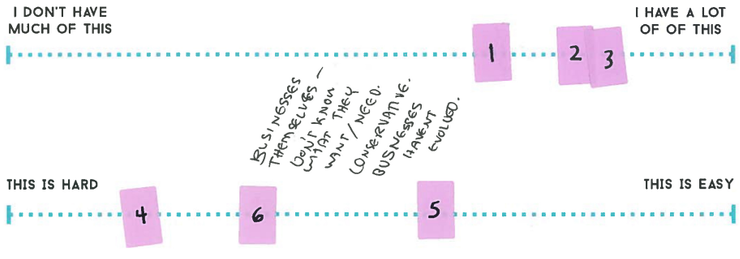
NAME: CHARLIE
AGE: 25
OCCUPATION: INTERN
NATIONALITY: DENMARK
LIVED IN CPH FOR: 4 YEARS.

## Directed storytelling




ACTIVITIES IN urban space

## Prioritization




## Questions

1. NO.

2. DEFINITELY BIGGER. GREENER. More sustainable food solutions. Create better living spaces for students. Transport cheaper. Eliminate transport in inn city.
↓ Improved.
continue becoming greener.

3. KIND OF — Work w/ red cross, volunteer work. Environmentalis Buy local food + support local projects.
RENEW. Volunteer sector + private sector. Take out getaways / g

# APPENDIX C:

*Selected service safaris*

*Date & time: March 17 - 21, various times*

*Location: Personal workspace*

The following are a selection of scanned service safari guides. Again, in the interests of space, not every safari guide has been included here.



## *Service Safari: Open Data*

**SITE DETAILS**

Location: Los Angeles
URL: ~~data~~ data.lacity.org

Describe the visual style and overall structure of the site.
- Big graphic on front page
- Minimal + modern navigation (burger menu)
- Very visual / colourful
- long-scrolling front page

What kind of information is on the front page?
- selected data set visualized (foreclosed properties)
- Intro - initiatives (city performance dashboard) + city controller (tax spending) etc.
- Search
- Data groups - Quick facts - Newsletter sign up.
- Contact info

What kinds of introductory information is there? (How to use, vision, why, etc.)
- Message from LA's mayor w/ "why" answered (vision)
- "Learn how to use the data" section @ bottom w/ The API, Training & FAQ.
- Newsletter - "Join the community" - Developer tools : how-to etc.

What peripheral information is listed - news, events, projects?
- News + updates blog showing pics etc. of events & newly added datasets [tumblr blog]
- Developer resources has events. Partnership w/ Socrata Open Data?

Is the site linked to any social media or blogging?
↑ internal, but actually tumblr.
- facebook: LA mayor's office
- twitter: eric garcetti, LA mayor.

* Dog + cat euthanasia airport dogfood spending.

What datasets are promoted on the front page?
- Visualized 2015 registered foreclosure properties [top + front]
- City performance dashboard: relevant statistics and displayed according to various categories
- City Controller: gov't expenditure - world council on open data
- Proposed budget - Historic places

How can one filter and search through the data
- Quick facts
- Search bar w/ suggestions
- Groups: public safety, the economy, environment, city services, city budget, events+ culture, parks + libraries, transport.

Are there any tools available to analyze or visualize the data?
- Visualization tool w/ various graph styles + options, shows immediately the view inside website.
- Filtering tool - search tool within dataset
- "Discuss" section

How are datasets described?
- Usually a small blurb explaining the contents of the dataset.
- Icon showing the basic type of dataset: charts, raw dataset, maps, stories, forms etc.

* translated

# Service Safari: Open Data

**SITE DETAILS**

Location: TAIPEI
URL: data. taipei

Describe the visual style and overall structure of the site.

- Search bar focus → central + large
- photographic background + top navigation
- short front page

What kind of information is on the front page?

- search + navigation
- lots of space dedicated to data categories.
- latest news, latest data sets, popular datasets → in text
- hot line

What kinds of introductory information is there? (How to use, vision, why, etc.)

- About section is first menu option, with a written description of why they're doing open data, a list of goals, and an event calendar.
- FAQ section w/ basic as well as specific questions.
- Downloadable development guide

What peripheral information is listed - news, events, projects?

- Events calendar in "about" section
- APP showcase w/ links to apps developed w/ this data
- News section

Is the site linked to any social media or blogging?

- facebook + twitter shareable, but no linked accounts.

What datasets are promoted on the front page?

- text-based lists of "latest data set" + "most popular" data sets

How can one filter and search through the data

- big search bar
- filtering tools along side
- tags.

Are there any tools available to analyze or visualize the data?

- Not ~~that I can see.~~ → can view in a table format for xls files!

How are datasets described?

- Metadata table, text (very little & not on main screen.)



# Service Safari: Open Data

**SITE DETAILS**

Location: LONDON
URL: data. london. gov. uk

Describe the visual style and overall structure of the site.

- MANY text boxes, one ~~long scrolling~~ centre column page w/ hierarchy of navigation.
- Photographic elements
- Not very modern – serious greys + blues.

What kind of information is on the front page?

- Set of small "taster" visualizations one can scroll over to see a small statistic (9 of them)
- twitter stream from "LDN mayor data"
- Blocks w/ different texts: city data, community, news, apps. partners.
- share this page button

What kinds of introductory information is there? (How to use, vision, why, etc.)

- welcome to datastore, short intro text.
- city data strategy link.
- city data strategy navigation option w/ vision @ top of page.

What peripheral information is listed - news, events, projects?

- News list (encourages collaboration)
- Developer platform – metadata API
- Community section = recent apps list

Is the site linked to any social media or blogging?

- users can tweet things / share them
- twitter account on front page

What datasets are promoted on the front page?

- Total workforce jobs
- Lost customer hours (tube)
- Recycling
- Recorded crime
- Net additional dwellings
- Population of London
- Childhood obesity
- International visitors
- Team london volunteers.

How can one filter and search through the data

- If one clicks one of these ^ gets to a dashboard w visualized data on that overall topic.
- Tags are linked to datasets. Can filter by tag.
- can search, or look thru topics, or look through formats, or publishers.

Are there any tools available to analyze or visualize the data?

Not really. Can preview excel sheets, or view visualisations of selected front-page datasets.

How are datasets described?

- They have a written description. Tags also.

* TRANSLATED *

# Service Safari: Open Data

**SITE DETAILS**

Location: BUENOS AIRES
URL: data.buenosaires.gob.ar

Describe the visual style and overall structure of the site.

- Modern w/ flat illustrations
- short front page
- gov't banner on top
- minimal navigation w/ search on top.

3 main round buttons:
DATA — APPLICATIONS — LABORATORY

What kind of information is on the front page?

- "NEW VERSION OF SITE" INFORMATION.
- Featured datasets w/ previes of item (written description + datatype tags)
- BA Digital blog w/ previews of posts

What kinds of introductory information is there? (How to use, vision, why, etc.)

- "ABOUT SITE" section describes vision + purpose
- describes wide range of things, incl. use of CKAN.

What peripheral information is listed - news, events, projects?

- "APPLICATIONS" site w/ may officially branded apps. Over 20.
- "Laboritary" section for testing things out. Actually looks more like news — perhaps the translation.

Is the site linked to any social media or blogging?

twitter, github anf Flikr → high quality, may pictures of cultre nights + events
twitter → only 31 followers, No tweets.
github → many posts on open-data related things

What datasets are promoted on the front page?

No t sure why, but 6 are:
- state highway
- interactive map
- tracking city projects
- plots
- interactive map
- land use survey
- operating civil defence.

How can one filter and search through the data

- various categories @ top
- tags
- formats
- search
- Different layout than many of the others — more flat / horizental

Are there any tools available to analyze or visualize the data?

No.

How are datasets described?

Written description + colour coded tags / datatype info.



* BETA *

# Service Safari: Open Data

**SITE DETAILS**

Location: SINGAPORE
URL: data.gov.sg

Describe the visual style and overall structure of the site.

- Many data visualizations
- short scrolling frot page — DATA focussed.
- very little navigation beyond search bar @ top

What kind of information is on the front page?

- information on dengue fever, w/ various visualized data sets
- "singapore at a glance" section, w/ various visualized data sets

What kinds of introductory information is there? (How to use, vision, why, etc.)

- only "about" section in minimal main navigation part. States vision, goals, etc.
- developer guide @ bottom.

What peripheral information is listed - news, events, projects?

- blog w/ few posts (new site). Otherwise not much — No developer ~~tools~~ stuff.

Is the site linked to any social media or blogging?

- Not that I can see.

What datasets are promoted on the front page?

- 3 w/ relation to dengue fever: dengue clusters, weekly cases, + outbreak statistics. [VISUALIZED]
- 7 w/ relation to "singapore @ a glance. One IN REAL TIME! (taxi availability)

How can one filter and search through the data

- search bar always @ top
- various topics.
- visualized sections previously mentioned.
- tags.
- minimal /non-existint filtering.

Are there any tools available to analyze or visualize the data?

- ~~many sets~~ - chart / table option @ top of each ^ page, to visualize dataset or map if that's relevant!

How are datasets described?

- very minimal text descriptions

# APPENDIX D:

*Communication Artifact -*

*Best Practice Report*

*Completed: May 8th, 2016*

# INTRODUCTION

This report attempts to identify and describe a set of inclusion techniques currently used successfully by urban living labs around the world. The methods and cases described here can be used as the basis for developing new stakeholder inclusion strategies – an iterative cycle of application which could ideally improve and refine the inclusion process as a whole.

## *What is an urban living lab?*

Living labs are localized areas of experimentation within urban environments in which stakeholders can collaboratively and iteratively develop new, technology-enabled urban solutions. Within an urban living lab citizens, businesses and government can come together within a real-life environment, over an extended period of time, to exchange knowledge and build ideas [1, 2, 3]. Innovations developed, tested, and iterated within a living lab should have the potential to be applied more broadly, across the urban landscape [4]. According to the European Network of Living Labs, an international benchmarking federation for living labs around the world, all living labs incorporate five key elements [5]:

**1. Active user involvement**
*(giving end users the power to impact the design process)*

**2. Real-life setting**
*(the provision of a development and testing ecosystem within a functioning, complex urban environment)*

**3. Multi-stakeholder participation**
*(involving a wide range of stakeholders – from technology providers, to governing bodies, to end users)*

**4. A multi-method approach**
*(combining a wide range of tools borrowed from diverse fields)*

**5. Co-creation**
*(an iterative design process with multiple stakeholder groups)*

The solutions explored within urban living labs are often part of what is collectively referred to as the 'smart city' – a widely publicized term for urban innovations which leverage technology to solve societal problems [4, 6]. There is a growing critique of the first wave of smart city discussion in relation to its strong technological-deterministic point of view. Increasingly, the conversation surrounding smart cities is turning towards collaboration: how can the complex network of stakeholders within urban environments work together to ensure that smart city innovation directly improves quality-of-life for citizens [4]. This contemporary smart city approach looks at technology as a solution enabler, rather than an innovation driver [2].

Living labs are considered best practice when it comes to collaboratively developing new smart city solutions [4]. Citizens have, within the last decade, experienced radical empowerment accompanying the internet-led democratization of knowledge, and gained access to massive new communication platforms [7]. This has resulted in a proliferation of bottom-up urban innovation initiatives [8]. Citizen-led and decentralized, these initiatives are often beyond the governance of traditional government [9]. This has resulted in some tension with the traditional, top-down approach to urban innovation. One of the frameworks being used to combat this tension is the living lab [10]. Within the controlled environment of a living lab, it is possible to keep "users continuously involved in making better products and services while their expectations are continuously monitored and reflected upon in a systematic process" [2] – a reconciliation of the energy and inclusiveness of citizen-led initiatives with the methodological and controlled approach of top-down urban innovation.

**DIVERSE STAKEHOLDERS:**

*are defined in this report as citizens of all demographics, as well as governmental departments, organizations, and businesses who are not currently involved in developing smart city solutions.*

## *Why is this analysis important?*

This analysis is important for two reasons. First and most obviously, the meaningful inclusion of a diverse range of urban stakeholders is widely perceived as essential for the development of useful urban solutions [4, 11, 12]. By including stakeholders outside of the IT industry in solution development, products and services can be made relevant for diverse urban demographics, and can find improved acceptance and greater ownership among end users [11]. Economic solution sustainability, a major challenge for many smart city solutions, can be greatly improved by ensuring that the social dimension and supporting context are focussed on as much as the technology itself [4].

Secondly, the reuse of knowledge is an integral part of the foundation of living lab theory [4, 13]. In order to build up a global canon of iteratively developed, well-functioning living lab practices, it is essential that each new instance builds on the experiences of previous labs [14] – and to facilitate this, for existing labs to make this information available. Unfortunately, this step is currently often neglected [15]. This report aims to make the practice of knowledge reuse, in this case with regard to inclusion, more accessible.

# ANALYSIS

The analysis presented here is primarily based on literature available on the web. There is a rapidly growing canon of research on the subject of living labs and inclusion, and it is from this writing that the insights presented here have been drawn.

## *Structure*

There were two steps involved in this analysis. First, an overview of literature revealed that diverse stakeholder inclusion practices currently fall roughly into seven major method areas. Within each method area, there are a large variety of specific applications possible – some already tested and described, others tested but not thoroughly described, and others yet to be specified and implemented. These method areas are:

**1. Facilitated DIY**

**2. Community Building**

**3. Panel Integration**

**4. Sustained Co-Creation**

**5. Crowdsourced Ideation**

**6. Citizen Science**

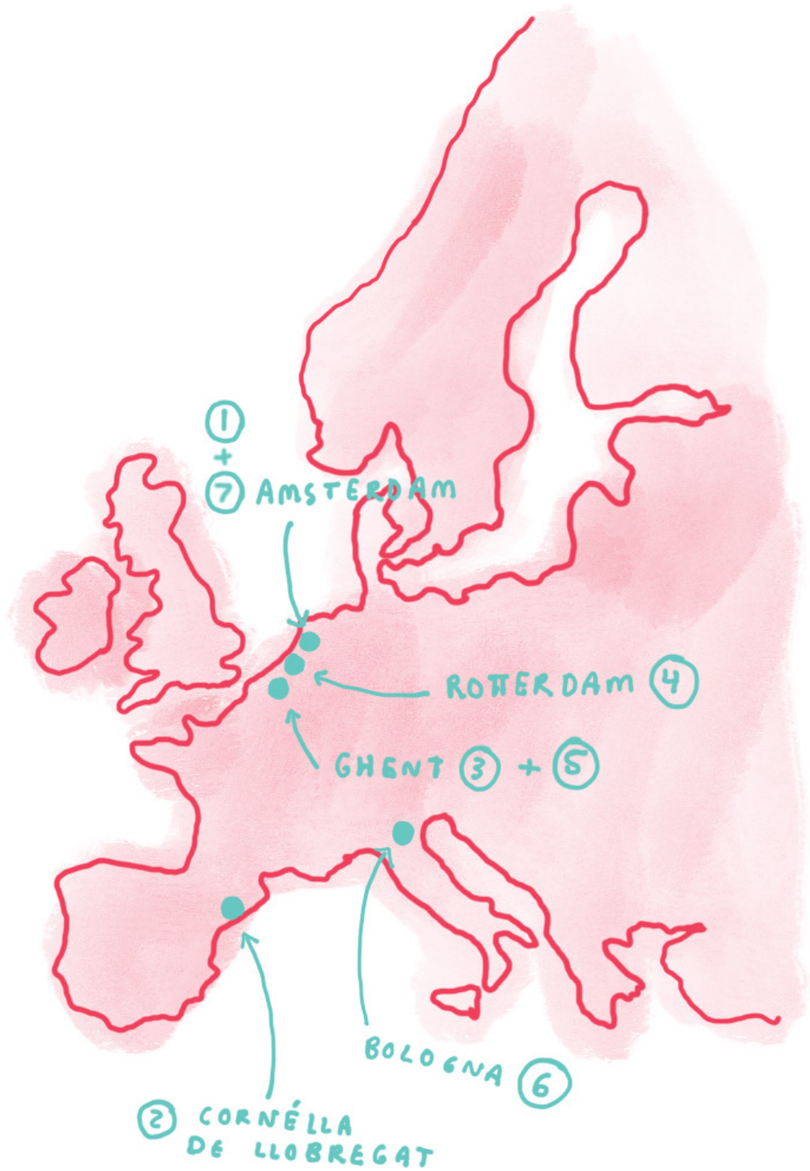
**7. Hackathons**

A case study was then selected for each method area, demonstrating a successful, specific application. A brief description of each case is presented here, with links to additional information.

Note that several of the case studies presented could fit into more than one of the described method areas.

## *A note on bias*

This analysis is based on the findings and opinions of other researchers, and as such is coloured by their biases – as well as the subjective opinion of the author. Additionally, availability of in-depth information, in English, on specific living lab instances was limited, and therefore this assessment is biased according to living labs on which sufficient information was available.

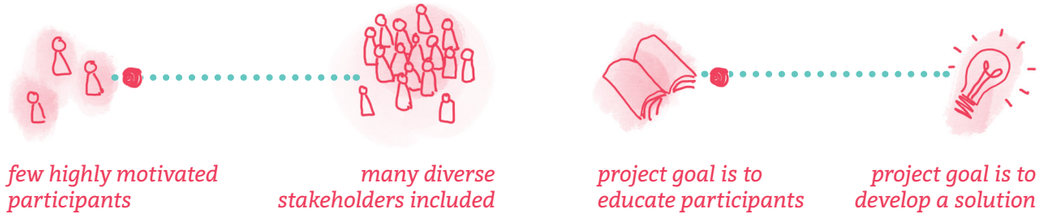



*Map of case study living labs, numbered according to the method area they exemplify.*

# AMSTERDAM SMART CITIZENS LAB

MORE INFO:

*waag.org/sites/waag/files/public/media/publicaties/amsterdam-smart-citizen-lab-publicatie.pdf*




## *What is Facilitated DIY?*

One way to introduce new stakeholders to the development of smart city solutions is through providing them with the tools and support to explore these concepts themselves. The 'support' element here is essential: without direct contact with experts and a structured learning environment it is easy for participants to become overwhelmed and lose motivation. This approach works best with smaller groups, so this close contact can be maintained. Common applications in this area are startup incubators or smart citizen labs, whereby small groups of motivated individuals are provided with tools and access to experts to develop their own ideas.

## *Case Description*

Amsterdam Smart Citizens Lab, organized by the Waag Society (with many partners), is a great example of facilitated DIY. This seven-step program, run for the first time in 2015, invites interested citizens to meet up and form groups interested in using technology to solve various urban issues. These groups then progress through a series of workshops and work sessions, towards creating a functional smart city solution. The participating citizens learn how to code, how to gather, understand and visualize data, and how to work with hardware. A localized workspace and an open door policy encourage knowledge sharing among groups and external citizens, and experts are on site to assist. Results from the Smart Citizens lab show that if given the correct tools and support, citizens can gain the data literacy required to actively participate in the design and implementation of smart city solutions.

## *Successes & Challenges*

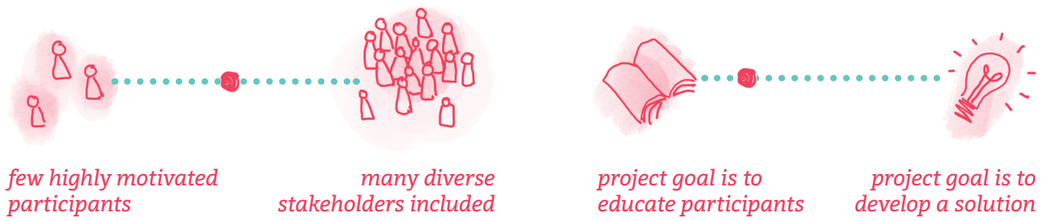
This case was successful mainly because of the strong support network provided. Citizen feedback indicated that without the attention of experts, they would have found the steep learning curve overwhelming. In fact, a similar project in Barcelona was much less successful in generating data precisely because this support network was not provided. The mix of participants also contributed to the success of this project: initial advertising was distributed over a wide range of platforms, leading to relatively diverse groups with expertise in a variety of areas. One major challenge that this project faced was maintaining citizen motivation - with such a large time commitment, many participants dropped out in the later stages of the lab. Technological barriers were also present, as low-cost sensing often produces unreliable data, impacting the participants' products and services.

# CORNELLÀ DE LLOBREGAT CITILAB

MORE INFO:

*citilab.eu/en*

*www.researchgate.net/publication/265906194_The_Living_Lab_methodology_from_Citilab-Cornella?channel=doi&linkId=542053360cf203f155c5858c&showFulltext=true*



*few highly motivated participants* — *many diverse stakeholders included*

*project goal is to educate participants* — *project goal is to develop a solution*

## *What is Community Building?*

Another method for initiating diverse stakeholder participation in smart city initiatives is through the creation of an 'involvement hub'. This is often a physical space, at which stakeholders can meet and exchange ideas, participate in workshops or lectures, and take part in jams or hackathons, or simply access the technological tools required to develop their own ideas.

## *Case Description*

Citilab, in Cornellá de Llobregat (Barcelona), is a civic innovation hub that has been in operation since the 1990's. Their physical location, a repurposed textile factory, is open to citizens, governmental agencies, and companies. All stakeholders can pose challenges, participate in events, or receive innovation training (a comprehensive 3-step program is provided to all citizens who join). They operate a card-based access system similar to a library, and currently have over 7,000 users (6% of Cornellá's population). Citilab also runs projects to help extend the boundaries of which kinds of stakeholders feel comfortable entering their space. To this end, they run a huge variety of 'labs': SeniorLab (assisting the elderly with developing innovation), Edutec (teaching kids about programming and hardware), MusicLab (helping young musicians create IT solutions), and LabourLab (helping those whose jobs have been made redundant by technology to create inventions), to name a few. Slowly, Citilab is also influencing how local governments and companies include citizens/users in their innovation processes.

## *Successes & Challenges*

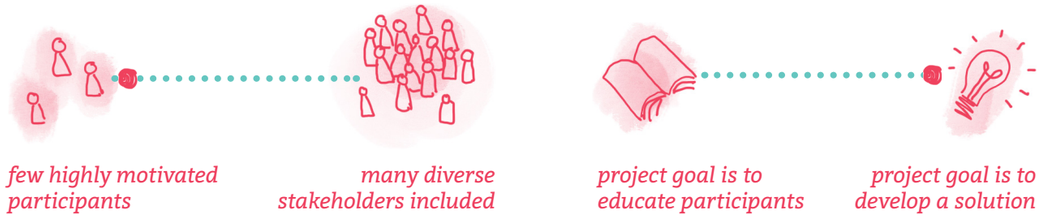
Citilab has had great, and widely recognized, success in getting stakeholders into its programs. This is due to two factors: their physical location provides accessibility, while their diverse projects help to introduce smart city innovation to typically excluded demographics. Because their physical location is so large, Citilab participants of all types can work in the same space, leading to cross-pollination of ideas and creating a feeling of belonging. One challenge they face is to introduce more social (bottom-up) innovation: challenges are currently mainly posed by companies and governmental bodies.

# FUTURE LEGENDS GHENT

MORE INFO:

*biblio.ugent.be/publication/4083727*

*chase.be/*






# PANEL INTEGRATION

## *What is Panel Integration?*

One strategy for including diverse stakeholders in living lab innovation is through panel creation - centering the process not around 'users', but instead around a carefully selected thematic panel. Panels are created through the use of large intake surveys and specific participant selection, tailoring the panel to the specific living lab project. Panel members elect to join the project, providing motivation and a sense of community. There are several advantages to this approach. The first is that more data is known about the participants, allowing initial design stages more contextualization. The second is that due to the 'opt-in' nature of panel selection, privacy concerns are minimized. Finally, a panel-centered approach is arguably more sustainable for longer-running living labs, as the stable, relevant panel becomes central to the living lab infrastructure. One requirement for this approach to function optimally is the design and implementation of a rigorous panel management approach [3, 16].

## *Case Description*

A successful application of panel integration in an urban living lab can be found in the 'Future Legends' project, part of Ghent Living Lab. This project aimed to create new types of media with and for marginalized youth. The process began with a large-scale intake survey, from which three youth 'personas' were developed. A representative panel of youth was then selected, corresponding to the identified profiles. Further research was then carried out on the panel member's media consumption and digital habits, through the use of probes, diaries, and workshops. The project then entered a co-creative phase, in which a concept was developed and iterated with the panel.

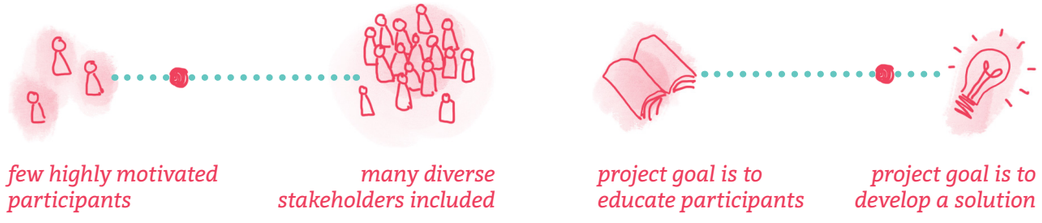
## *Successes & Challenges*

This project had two tangible results. The first was a wealth of concrete policy advice on how best to stimulate cultural participation in marginalized urban youth. The second is a sustainable, independent online service (established through government funding) - chase.be. The service consists of an online platform on which youth can connect, and express themselves creatively through radio with the help of influential mentors. The service now runs autonomously and is entirely community-supported: an indisputable success. The team involved in this project performed a very thorough categorization process when it came to organizing the results of the recruitment survey, overcoming one of the biggest challenges in a panel-based approach: the possibility of biased panels providing invalid feedback.

# EMERGING MEDIA ROTTERDAM

MORE INFO:

*timreview.ca/article/607*








## *What is Sustained Co-creation?*

Sustained co-creation is the involvement of diverse stakeholders throughout the innovation process, often through a series of workshops and events. End users are treated as equal partners in the innovation process. This process differs from 'facilitated DIY' in that solution creation is the major focus of the exercise–not a the learning process. Solutions developed through sustained co-creation are the same solutions that will be tested in the living lab itself. A key element is keeping users deeply integrated throughout the design process. This requires some planning and resource dedication, but results in a truly open innovation process. To facilitate this, agile and iterative development processes, for example SCRUM, should be used.

## *Case Description*

The 'Emerging Media' project, part of Rotterdam Living Lab, was a 20-week example of sustained co-creation in which teams of citizens and public authorities looked at new ways to utilize public open data. Students from diverse backgrounds were paired with civil servants from various departments, and together these groups addressed needs found throughout the city. SCRUM methodology structured the process. Local creative agencies were used in an advisory role, assisting the groups with project planning and progression. The groups developed user stories, then solution concepts, which were assessed and voted on in a concluding event. Five concepts were selected for further exploration [17].

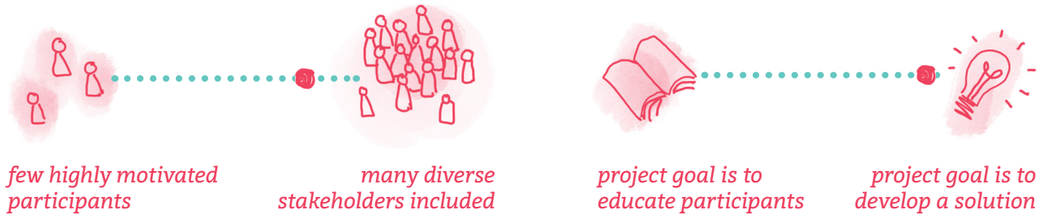
## *Successes & Challenges*

The groups produced relevant and novel solutions, covering a diverse range of topics. A large amount of public open data was released as a result of this project, as the solutions developed helped to demonstrate how useful more open data could be. Furthermore, this case is a nice example of all three major stakeholder groups (the public sector, private sector, and citizens) all collaborating together on smart city solutions. Students were selected as the target citizens due to access, but this had the added benefit of providing intrinsic motivation. This motivation factor among the citizens would be a challenge when reproducing this process with another demographic.

# MY DIGITAL IDEA FOR GHENT

MORE INFO:

*www.scielo.cl/pdf/jtaer/v7n3/art06.pdf*








## *What is Crowdsourced Ideation?*

One way to engage diverse stakeholders in living lab innovation is through crowdsourcing - through gathering input from a very large group of people. Crowdsourcing can be used at various stages in the innovation process, but seems to be most commonly implemented within living labs at the ideation stage. This process involves the creation of an online platform through which stakeholders in the urban space (citizens, business owners, etc.) can suggest and give feedback on ideas. This process is usually formatted as a short-term challenge, and sometimes a reward is offered for the best or most popular idea. The top ideas are selected either by an internal panel, or by the participants themselves (through some voting system).

## *Case Description*

My Digital Idea for Ghent (Mijn digitaal idee voor Gent) is a crowdsourced ideation project implemented as part of Ghent living lab, which asked participants for ideas related to “how might ICT could improve your everyday life in the city”. An online platform was set up supported by EU funding, and announced through local newspapers and mass emails to university students. It was then independently shared on social media, and eventually amassed over 5,500 visits. Approximately 1,500 participants registered themselves on the site (necessary to post an idea). Participants were able to post an idea, view other ideas, comment on ideas, reply to comments, or vote on their favorite submissions (each participant could vote 3 times). The process was incentivized with an iPad Air 2, given out to a random participant. A total of 128 ideas were generated through this process, and 4800 votes were cast.

## *Successes & Challenges*

This example of crowdsourced ideation was successful in that there was a relatively high level of participation–despite minimal motivation–and participants proved themselves capable of assessing the ideas effectively for usefulness. The process did not result, however, in many truly disruptive or radical innovations. Ideas tended to be vague and well within the realm previous innovation–suggesting that crowdsourcing might not be the ideal method for soliciting these kinds of breakthrough ideas. One interesting suggestion is to utilize crowdsourced ideation as a first step for deeper participation. For example, participants could be selected to join a stakeholder panel, or become ‘gatekeepers’ (testing innovations before other users).


# PARTICIPACT BOLOGNA

MORE INFO:

*participact.ing.unibo.it/infoen/*

*few highly motivated participants*

*many diverse stakeholders included*

*project goal is to educate participants*

*project goal is to develop a solution*





## *What is Citizen Science?*

Citizen science is another form of crowdsourcing, in which the crowd is used to gather information. In an urban context, citizens (and their mobile devices) can act like sensors providing the big data required to develop smart city services. They can also act as actuators, implementing changes in the urban environment. In order to do this successfully, a technical platform must be developed and motivation must be provided for citizens to participate (monetary, social, etc.). A community should also be developed around the initiative to provide citizens with information, camaraderie, education, and a platform for action.

## *Case Description*

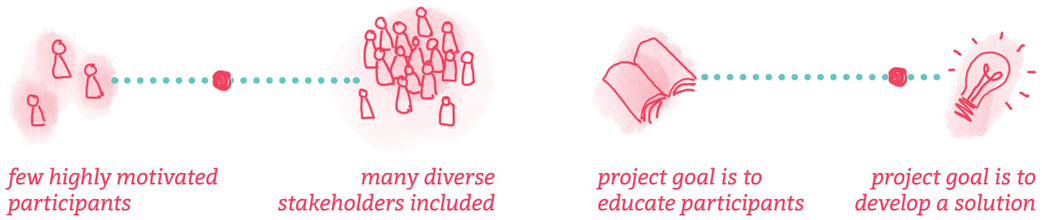
The experimental ParticipAct project, run by the University of Bologna, involved 300 citizens over a one year period, and exploited mobile device technology to gather data. Both passively collected smartphone sensor data and actively contributed data (eg. taking a photograph or tagging something) was gathered. The citizens (students at the university) were provided with smartphones. The phones passively gathered sensor data, and also showed specific tasks, within their normal local area, which participants could choose whether or not to participate in. Citizens could freely stop participating at any time. The

# APPSTERDAM AMSTERDAM

MORE INFO:

*amsterdamsmartcity.com/hackathon/*

*appsterdam.rs/*








## *What are Hackathons?*

Hackathons are an inclusion method that has increasing popularity.
The basic format is a time-limited, challenge-based collaborative work session, with a focus on intensive teamwork. Participants typically address a certain theme for around 48 hours, working together within a shared space. Hackathons focussed around smart city development often include the theme open data, and participants are often given access to open urban datasets and asked to create useful applications. Technical support is often available, but participants generally also support each other. The goal of smart city hackathons is usually to create workable solutions.

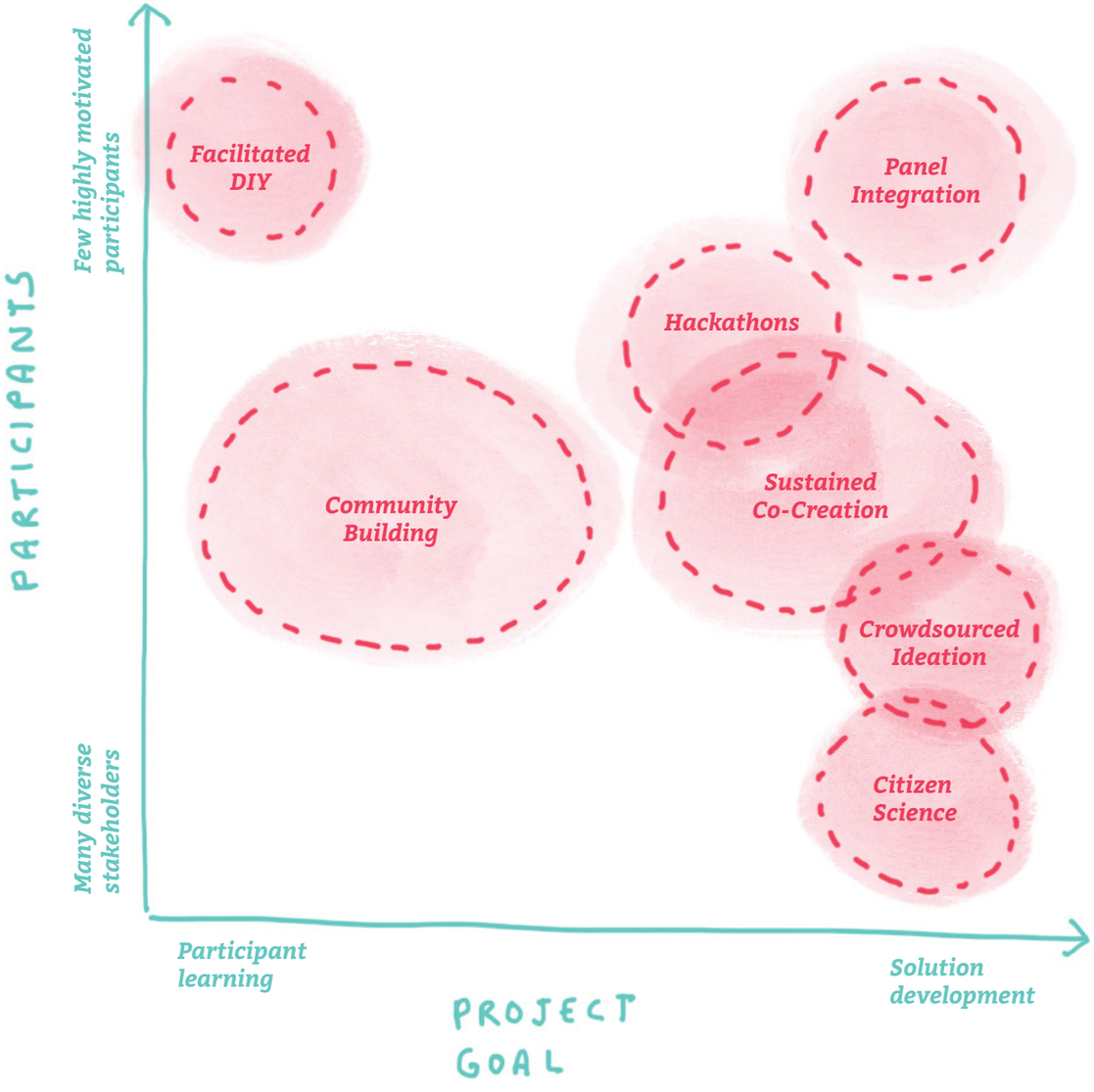
## *Successes & Challenges*

The quality of the services produced during this hackathon was extremely high. Participants developed working app prototypes on topics ranging from mapping sports arena amenities to safer public facial recognition. One challenge with the hackathon format is that the sustainability of products developed within this context is tenuous. After participants complete the 48 hours, bright ideas are often abandoned due to a lack of support for further development. Another challenge is bringing more diversity to the format: hackathons typically (for good reason) attract a crowd of development/design/startup involved participants, which can exclude other citizen perspectives.

## *Case Description*

Appsterdam was 48-hour event in Amsterdam, which drew a total of 65 participants last year. Participants were given access to 100 datasets, as well as cutting-edge technological infrastructure (ex. iBeacons and a LoRa network), and asked to develop applications for the city of Amsterdam. Participants divided into groups according to interest, and then worked to develop a concept. An awards ceremony at the event's conclusion rewarded the best creations, according to a panel of judges.

# COMPARISON






# REFERENCES


[1] Niitamo, V., & Kulkki, S. (2006). State-of-the-art and good practice in the field of living labs. In *Proceedings of the 12th International Conference on Concurrent Enterprising: Innovative Products and Services through Collaborative Networks*, Milan, Italy. (pp.349-357).

[2] Paskaleva, K. A. (2011). The smart city: A nexus for open innovation? *Intelligent Buildings International*, 3(3), 153-171.

[3] Schuurman, D., Lievens, B., De Marez, L., & Ballon, P. (2012). Towards optimal user involvement in innovation processes: A panel-centered Living Lab-approach. In *Proceedings of PICMET'12* (pp. 2046–2054).

[4] Baccarne, B., Schuurman, D., Mechant, P., & De Marez, L. (2014). The role of Urban Living Labs in a Smart City. *XXV ISPIM Conference*, (June), 1–14.

[5] ENoLL (European Network of Open Living Labs) FAQ. (n.d.). Retrieved April 05, 2016, from http://www.openlivinglabs.eu/

[6] Veeckman, C., & Shenja van, d. G. (2015). The city as living laboratory: Empowering citizens with the citadel toolkit. *Technology Innovation Management Review*, 5(3), 6-17.

[7] Castells, M. (2012). *Networks of Outrage and Hope: Social Movements in the Internet Age*. Berkeley, CA, USA: University of California.

[8] Foth, M. (2009). *Handbook of research on urban informatics: The practice and promise of the real-time city.* Hershey, PA: IGI Global.

[9] De Lange, M., & de Waal, M. (2013). Owning the city: new media and citizen engagement in urban design. *First Monday*, 18(11).

[10] Almirall, E. (2008). Living Labs and open innovation: roles and applicability. *The Electronic Journal for Virtual Organizations and Networks*, 10, 21–26.

[11] Eskelinen, J., Lindy, I., Marsh, J., & Muente-kunigami, A. (2015). *Citizen-Driven Innovation – A Guidebook for City Mayors and Public Administrators.* World Bank and ENoLL.

[12] Bergvall-Kareborn, B., Eriksson, C. I., & Ståhlbröst, A. (2015). Stakeholders in Smart City Living Lab Processes. *Proceedings of the 21st Americas Conference on Information Systems (AMCIS 2015)*, 1–11.

[13] Nyström, A. G., & Leminen, S. (2011). Living lab - a new form of business network. *17th International Conference on Concurrent Enterprising, (Ice)*, 1–10.

[14] Mulder, I. (2012). Living Labbing the Rotterdam Way : Co-Creation as an Enabler for Urban Innovation Co-Creation as an Enabler for Urban Innovation. *Technology Innovation Management Review*, 2(9), 39–43.

[15] Baccarne, B., Mechant, P., Schuurman, D., De Marez, L., & Colpaert, P. (2014). Urban socio-technical innovations with and by citizens. *Interdisciplinary Studies Journal*, 3(4), 143.

[16] Schuurman, D., & Marez, L. De. (2012). Structuring User Involvement in Panel-Based Living Labs. *Technology Innovation Management Review*, 2, 31–38.

[17] Conradie, P., Mulder, I., & Choenni, S. (2012). Rotterdam open data: Exploring the release of Public Sector Information through co-creation. *2012 18th International Conference on Engineering, Technology and Innovation, ICE 2012 - Conference Proceedings*, 1–10.

[18] Cardone, G., Cirri, A., Corradi, A., & Foschini, L. (2014). The participact mobile crowd sensing living lab: The testbed for smart cities. *IEEE Communications Magazine*, 52(10), 78–85.

[19] Cardone, G., Foschini, L., Bellavista, P., Corradi, A., Borcea, C., Talasila, M., & Curtmola, R. (2013). Fostering participaction in smart cities: A geo-social crowdsensing platform. *IEEE Communications Magazine*, 51(6), 112–119.

# APPENDIX E:

*Observation Diary & Citizen Surveys*

*Dates & times:*

*- May 7th, 12pm - 1pm, public holiday*

*- May 11th, 1pm - 2pm, weekday*

*- May 19th, 5pm - 6pm, weekday*

*- May 28th, 8am - 9pm, weekday*

*- June 4th, 6pm - 7pm, weekend*

*- June 6th, 1pm - 2pm, weekend*

A selection of highlights from several of the observation sessions is collected here, including some of my notes, photographs, and completed citizen survey guides.

**Observation within Street Lab area 1: 12pm-1pm, Friday, Public Holiday/Event**

Today was a holiday in Denmark (Kristi himmelfarts dag), and an event was going on in Rådhusplads, so space usage differed markedly from usual. Both the square and connecting roads were much more crowded than usual, with attractions and music dispersed throughout the area. A large proportion of the crowd was tourists, both Danish (either coming in from other parts of the country for the event, or visiting from other parts of Copenhagen) and international. There were also local residents interspersed in the crowd. Much of the crowd was elderly. People were concentrated in Rådhusplads, observing the entertainment, and the crowd thinned out further along the streets. Many people were sitting on the benches in Rådhusplads, and the cafes patios were full. Local residents were observed walking dogs, carrying groceries, and sitting in the sun. As this was the first official observation session, I tried to identify initial user groups:

- Foreign Tourists
- Danish Tourists
- Copenhageners (who live outside the Street Lab area) (mostly shopping or there for that event)
Commuters (those passing through - mostly on bike)
- Residents
- Workers (people working in the area)

Further observation sessions will refine this list. For this observation session, foreign tourists and copenhageners were the most numerous users observed, with danish tourists and residents following.

When tourist paths were shadowed, they tended to walk around Rådhusplads, then move into Strøget – avoiding the more eastern areas of Vester Voldgade and H. C. Andersens boulevard. Tourists walked slowly (obviously), stopping to look at signs, take pictures, chat, look at maps, etc

Though it was crowded near Rådhusplads, the seating areas down V.V. were nearly deserted.

No interviews were completed this session, I attempted to capture all user groups through photographs of the area.

*[left] relevant photos from observation session 1*




**Observation 2: 1pm-2pm, wednesday**

Today was a lot quieter than the last observation, with a markedly different group of people. There were still many foreign tourists, but many less than previously. Instead there were many more danes, eating in the cafes, shopping, cycling past, walking, and working in the area. I also noticed this time that there are in fact a small population of displaced/homeless/marginalized people in Rådhusplads also. There is also a counter on the bike lane, something I also previously overlooked. A small event was going on near city hall, organized by a TV show. There was also a lot more active construction, and the workers to go with that. Not much of it (apart from Bloks) was labelled. There is also a school (Jokatskole? Lokaleskole?) in the area, and I noticed that they've been involved with beautifying the Bloks construction site.

There is much construction in this area, I counted four distinct sites, some of which have project explanation placards and some don't.

This time I completed six short citizen interviews. 5 out of the 6 people I approached were tourists or foreign exchange students, visiting Copenhagen for various reasons. This probably has to do with the time of day, and the weather.

*[left, p. 130] citizen interview sheets*




*Age:* 60 + 40
*Occupation:* retired + teacher
*What are you doing here?*

Commuter | Tourist | Resident | Work here

*Other:* himmelfarts dag event.

*How often are you here?*
not so often..

*What do you know about 'smart cities'?*

*Age:* 22 + 25
*Occupation:* students
*What are you doing here?*

Commuter | Tourist | Resident | Work here

*Other:*

*How often are you here?*
First time

*What do you know about 'smart cities'?*
Something about improving cities

*Age:* 55
*Occupation:* accountant
*What are you doing here?*

Commuter | Tourist | Resident | Work here

*Other:*

*How often are you here?*
3rd time

*What do you know about 'smart cities'?*
better transport

Age: 58
Occupation: secretary

*What are you doing here?*

Commuter | Tourist | Resident | Work here

*Other:*

*How often are you here?*

every day

*What do you know about 'smart cities'?*

X

---

Age: 26
Occupation: student

*What are you doing here?*

Commuter | Tourist | Resident | Work here

*Other:*

*How often are you here?*

3-4 times / week

*What do you know about 'smart cities'?*

places where tech is used to improve urban life.

---

Age: 25 + 26
Occupation: students

*What are you doing here?*

Commuter | Tourist | Resident | Work here

*Other:* studying Law.

*How often are you here?*

~~4h this thursday~~
6 months here, so often at. Once a wk.

*What do you know about 'smart cities'?*

putting tech in cities to make work better



**Observation 5: Wednesday 8:00 - 9:00**

This morning observation session was relatively quiet. Some early-morning tourists were wandering through Rådhusplads, many of which seemed to be younger student-age individuals. I shadowed a few of them as they observed the statue in Rådhusplads, walked around the city hall, then turned towards Vesterbro and walked along Vesterbrogade.

One likely homeless woman could be seen sleeping in the top left corner of the square, near H. C. Andersens boulevard, but otherwise there were very few displaced people in the area.

Commuter traffic was heavy. Many cyclists used the bike lane at H. C. Andersens boulevard, with some cutting through the square. Other commuters walked through the square, mostly entering the city centre after crossing Vester Voldgade. Car traffic was also relatively heavy at this hour.

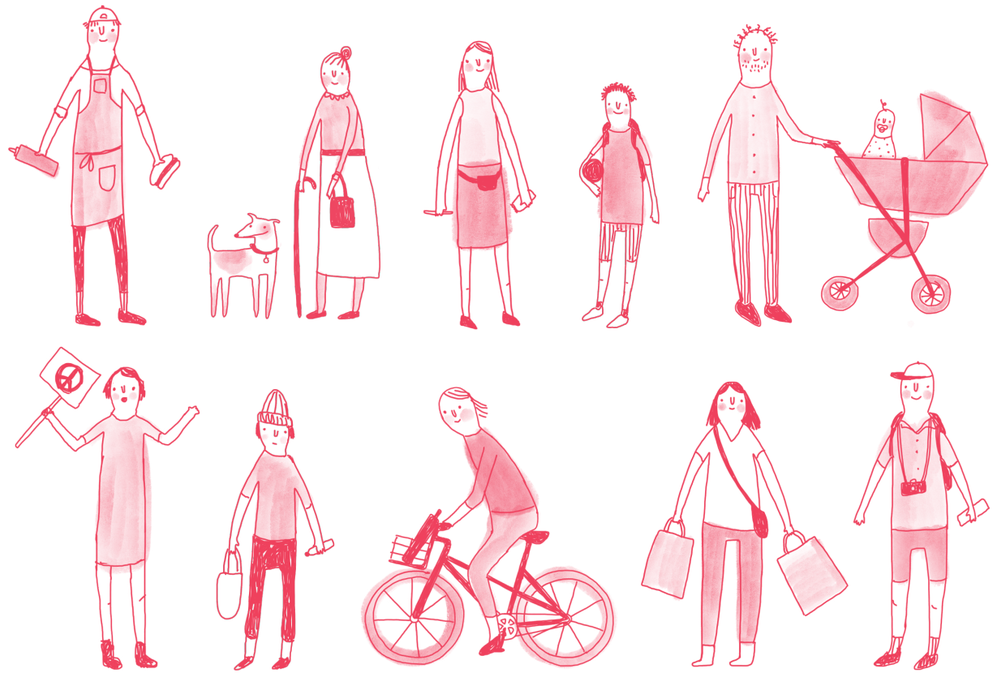
The ends of both streets were extremely quiet, with no citizens visible.

## APPENDIX F:

*Demonstration Artifact -*

*Solution Roadmap*

*Completed: June 11th, 2016*



# SOLUTION ROADMAP

## WAYS TO INCLUDE MORE PEOPLE IN COPENHAGEN STREET LAB

*Lara Casciola*
*Service Systems Design - Master's Thesis*
*Deliverable 2/3*
*AAU Copenhagen*

# CONTENTS



*[below]* Street Lab area is highlighted


# CONTEXT

This document contains a wide range of ideas for how to include more diverse stakeholders in Copenhagen's new urban living lab, Street Lab. Some of the ideas can be implemented right away with little effort, and others are more large scale – forming the basis for developing a truly open, user-centred, and citizen-engaged space for innovation

The ideas presented here are based on an understanding attained through various research methods: observations and interviews in the urban area where Street Lab will be located; interviews with design professionals and citizen inclusion specialists; and an assessment of current best practices throughout the world*.

## *What is Street Lab?*

Street Lab is an urban living lab project within Copenhagen, a place to develop and test smart city technology. It is a physical space that encompasess two main roads and a central square in the downtown area, where infrastructure such as the low frequency network LoRa, and public wifi, have been set up. Data collected by the project will be publically available on Copenhagen's open data site, data.kk.dk, although not in real time.

Street Lab is currently scoped to last two and a half years, and is organized Copenhagen Solutions Lab (referred to as CSL from here on), a branch of the Technical and Environmental department within Copenhagen Municipality, in collaboration with Cisco, Citelum and TDC. A public-private innovation partnership underlies the project, with all stakeholders providing capital in the hopes that future technologies will be developed here.

Six projects were selected through an application process for the first wave of testing in Street Lab, and CSL is currently developing a mechanism through which tech companies can apply to have their innovations tested in the lab in future waves. As the project is still in its initial stages, a cohesive strategy hasn't yet been implemented to involve stakeholders outside of the tech industry and educational field in developing smart city solutions.

* See deliverable 1/3, "Best Practice: Diverse Stakeholder Inclusion in Urban Living Labs".

# CONTEXT CONT'D

## *Identified Users*

Street Lab is located in a heavily and diversely utilized area: many different types of people and businesses use the space for a huge variety of reasons. Some of the major types of user are presented here as basic role personas, to provide context and a framework for assessing ideas.

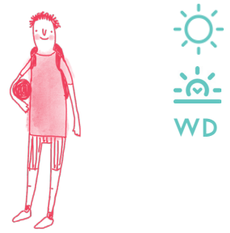
The personas are split according to perceived motivation. For example, 'protestors' are separate from 'event-goers', even though technically both are attending events, due to highly divergent reasons for attendance.

These icons (below) show the times when these role personas most frequently use the Street Lab area

- *Mornings*
- *Daytime*
- *Afternoons*
- *Evening/night*
- WD *Weekdays*
- WE *Weekends*
- SE *Special events*

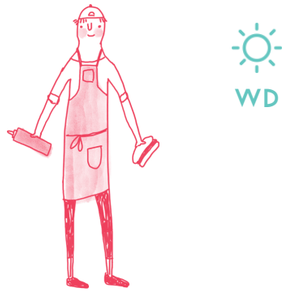

***Residents***

This is a somewhat affluent neighborhood, with varied residents




***Schoolkids***

There is a school and several daycares in this area

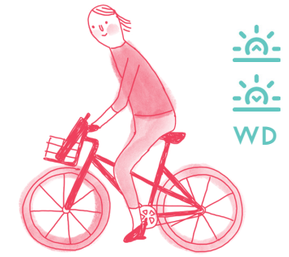



***Business Owners***

Small and medium-sized businesses line the streets in the area


***Marginalized People***

Displaced or otherwise struggling citizens can also be found here




***Commuters***

There is a large amount of traffic (bike + car) through this area


***Event-goers***

CPH residents attend various kinds of events at Rådhusplads


***Shoppers***

The area backs onto CPH's busiest shopping streets


***Municipal Workers***

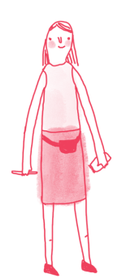
Work throughout the area in maintenance and other areas


***Tourists***

This area hosts several major tourist destinations


***Protestors***

Rådhusplads hosts most of CPH's protests, due to proximity to City hall




***Workers***

A huge variety of citizens work in diverse positions in this area

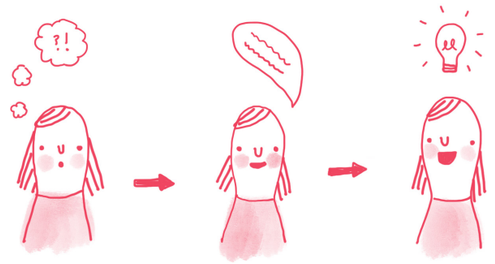
# CATALOGUE STRUCTURE

The ideas presented here are sorted according to three major categories, corresponding to three major levels of diverse stakeholder engagement. These are:

1. **Awareness:** *stakeholders should be aware that the Street Lab is occurring, and have easy access to more information if desired*

2. **Participation:** *there should be a diverse range of participation opportunities, corresponding to a diverse range of abilities and interests*

3. **Initiation:** *stakeholders should have the opportunities and support required to initiate projects*




Generally, these three categories follow a scale of increasing complexity: ideas within 'awareness' are easy to implement, supplement the current Street Lab direction. 'Participation' ideas are slightly more complex, and ideas in the 'initiation' category are larger-scale strategic initiatives.

**Note:** Green boxes like this one will highlight the individual ideas that build up larger concepts on the following pages.

# AWARENESS

In order to bring more types of people into the Street Lab innovation process, they first have to be aware that it is occurring. This process must be effortless on the part of the users. Though of course not everyone who learns about Street Lab will be interested in getting further involved, it is important that this is a conscious decision. Channels for further learning and participation should be clearly defined for those that are interested in learning more or getting more involved.

## *Place Branding*

As Street Lab is a high-traffic physical space, it therefore makes sense to create a physical awareness strategy. This involves the creation of a coherent, consistent identity, one which users can recognize and gather understanding from as they move through the space. This process is referred to as place branding. In recent years place branding has been used by Danish agencies to draw attention to emerging neighborhoods (see the collaborative effort to define Bellakvarter), and redefine old ones (see Urgent Agency's award-winning work with Billund), with great success.

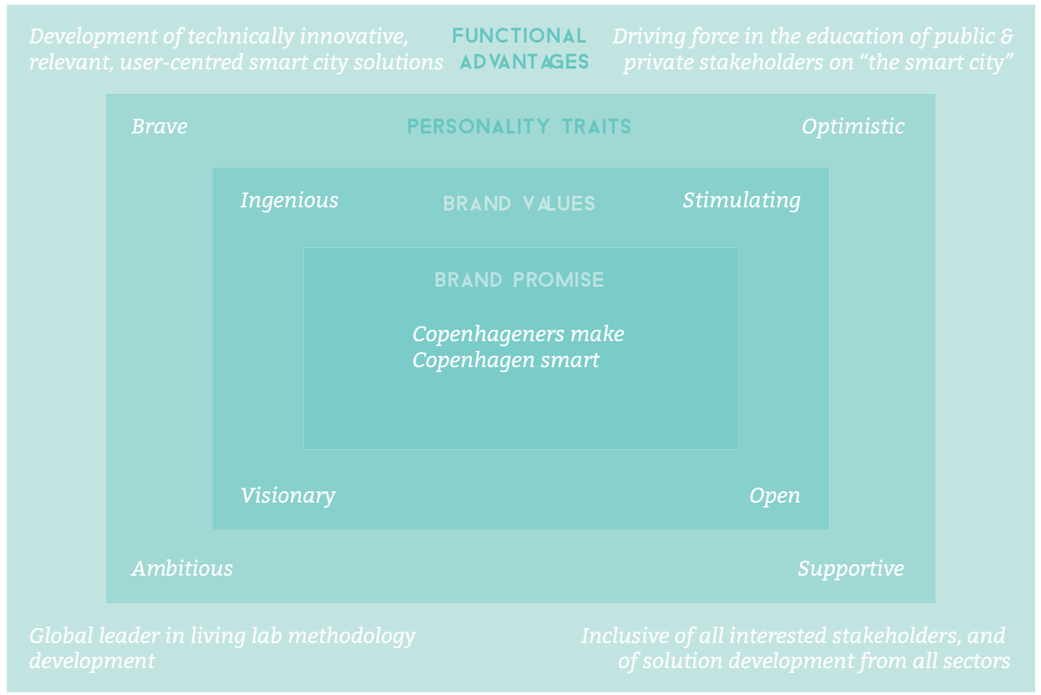
In the case of Street Lab, the focus should be on providing a low-level, clear, digestible explanation of the project, utilizing teaching opportunities, and piquing the interest of passers-by through visualization.

## *Who will this work for?*

This initiative will work best with those who spend relaxed, entertainment-seeking time Street Lab area. This includes residents, who may encounter the signs and exhibits as they move through their neighborhood; shoppers, who might take the time to interact on their way to the shopping area; event-goers, who might take the time to experience the area while attending their event; and finally, tourists - who will inevitably come into contact with the signs and exhibits as they explore. More targeted initiatives could help bring in other stakeholder groups, such as commuters or workers in the area.

*[below]* This brand platform diagram (developed by the design agency Kontrapunkt) helps to clarify Street Lab's competencies, mission, and values. This unified vision provides a basis for developing an identity, and could be used as a tool for stakeholder alignment.

Shown here is a conceptual version created by the author.



A draft logo and very basic identity have been created to help with the concept visualization.

In the following pages, various place branding initiatives that could be implemented within the Street Lab area are illustrated.

CPH
STREET
LAB

*Attention-grabbing colours, without loosing serious tone*

*Reference to quadruple helix of innovation, each stakeholder group becomes an essential column. Image recalls both buildings and children's blocks*

*Solid, chunky font is assertive but slightly playful*

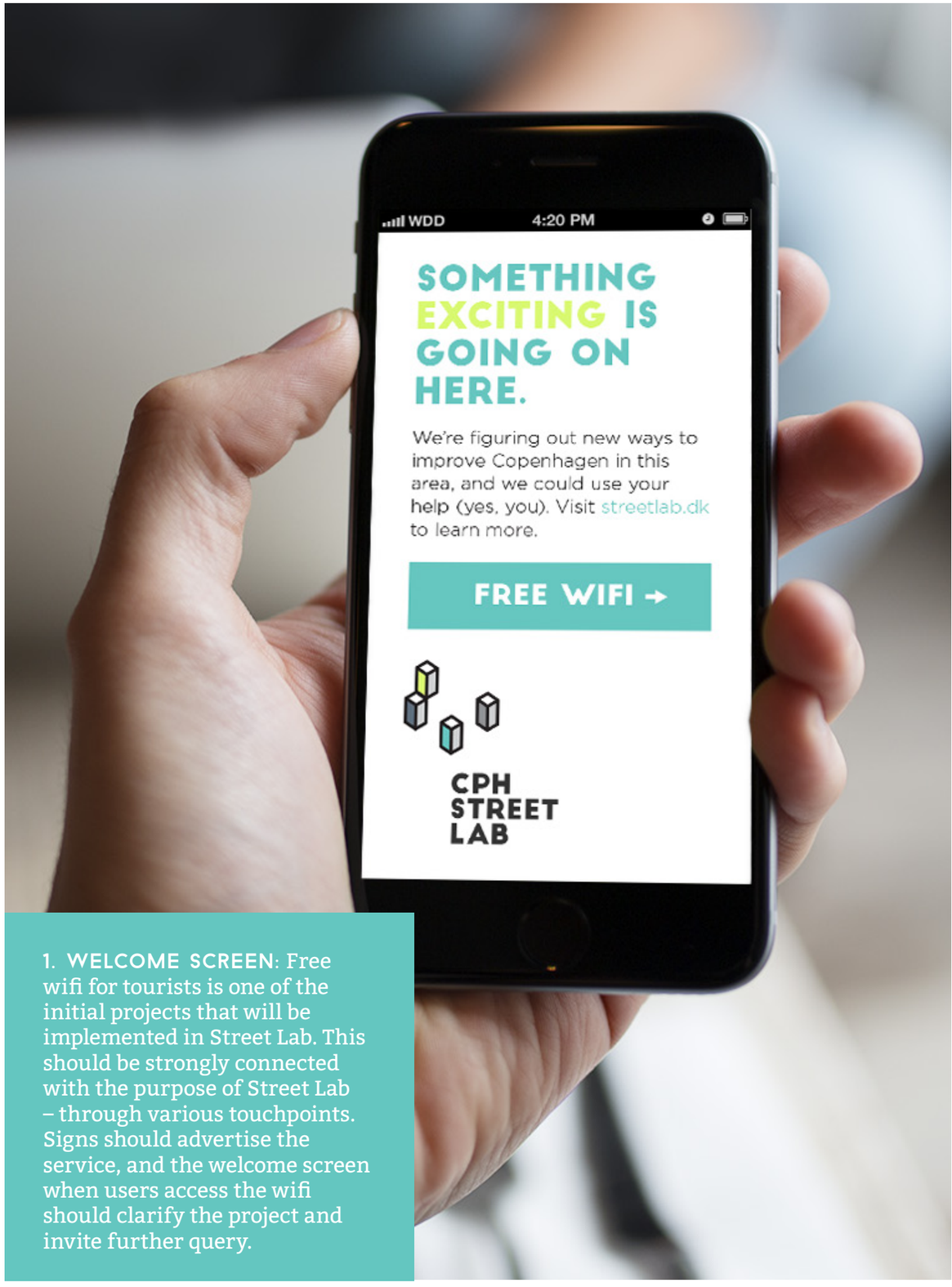
R 217
G 250
B 112

R 102
G 199
B 191

R 94
G 112
B 125

R 145
G 148
B 150

R 207
G 209
B 209




1. **WELCOME SCREEN**: Free wifi for tourists is one of the initial projects that will be implemented in Street Lab. This should be strongly connected with the purpose of Street Lab – through various touchpoints. Signs should advertise the service, and the welcome screen when users access the wifi should clarify the project and invite further query.


**2. FACT-BASED CAMPAIGN:** To make Street Lab more transparent, projects should be clearly described where possible through a fact-based campaign. Signs placed in the area could pique the interest of passers-by, and highlight some of the information being uncovered in the lab.


**4. INTERACTIVE EXHIBITS:**
To initiate more dynamic engagement from passers-by, simple interactive exhibits could be created. By gathering data from citizens in an engaging, analogue format, a valuable teaching situation could be created. This strategy could also be leveraged to gather meaningful information – a totally different kind of sensor.

In the iteration shown here, an interactive exhibit is being used as an alignment tool with regard to future city visions.



**3. LABELLING EQUIPMENT:** Major equipment installations could also be labelled, again increasing transparency and adding interest to otherwise overlooked aspects of the urban landscape.

**5. DATA VISUALIZATION:**
Perhaps the most obvious way to bring Street Lab into the real world is through publically visualizing the data being created in the area. This can be done in a lot of ways, but the most important aspect is that the information is presented in a clear, relevant, and engaging manner. The Street Lab area has several natural channels through which to display this data, including a large advertising space in Rådhusplads, and an interactive screen-based exhibit space (run by the Museum of Copenhagen) further down Vester Voldgade.


**6. WEB PRESENCE:** It is essential that in all cases, those interacting with place brand materials have the opportunity to access more information. To facilitate this, Street Lab's web presence should be bolstered. Street Lab's website should, at a minimum, list the goals and purpose of Street Lab, current projects being tested (and links to the data they are inputting to data.kk.dk) organizational stakeholders, timeline, information on living labs in general, project initiation portal, and organizer contact information. This web presence could serve as the basis for many other more engaging digital initiatives.



## *Next Steps*

To bring this concept to a professional level, a design agency should be involved in both the identity and website creation. Some expense will inevitably be involved in the design process and implementation. However, compared to the cost of more elaborate involvement strategies (such as a physical space, workshop facilitation, etc.) this is a very economical way to provide some level of diverse stakeholder engagement. An added bonus is that the identity can be used in, for example, press releases and news articles – bringing attention and acclaim to the project.

# PARTICIPATION

Getting users to participate actively in Street Lab requires a multi-legged approach. Given the breadth of the potential user group, varying channels precisely targeting different groups are essential. These channels should cater for differing levels of commitment, interest groups, knowledge levels, and demographics – but all should strive to impart some knowledge about smart city technologies, and gather feedback and input from participants.

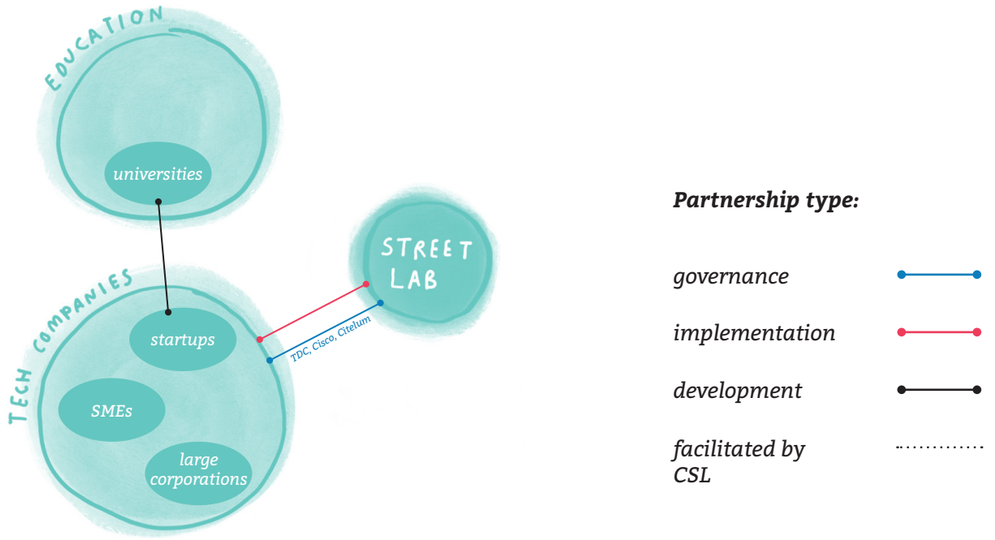
## *Partnerships*

The task of developing all these channels is likely to be beyond the scope of any one organization – and certainly beyond a small municipal department. A series of private and public-sector partnerships is therefore suggested. Bringing in partners from outside the technology sector and connecting them with tech actors (students, startups, SME's, or larger corporations involved in technology development), then facilitating a concept development process, could result in a wide range of innovative initiatives within Street Lab. This strategy requires the development of strong soliciting, conceptualizing, and support capabilities from the CSL organizers. To clarify this idea, an initial analysis and user journeys have been created, and some potential partnership candidates are described on the following pages (although of course there are many other possibilities).

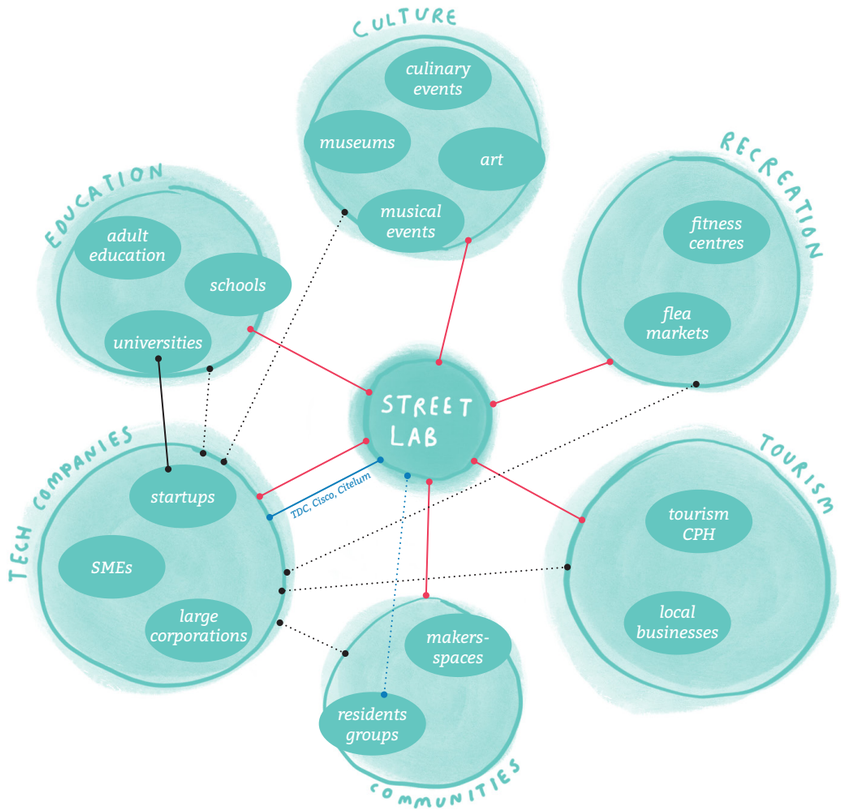
To the right (top), is a mind map showing the current partnerships that exist within Street Lab (excluding investment partnerships for the sake of simplicity). The figure below shows some possible new partnerships that could be initiated (although by no means is this an exhaustive list).

## *Who will this work for?*

This initiative could reach a huge range of stakeholders. Depending on the partners involved, various types of citizen, businesses, and educational institutions could be involved in widely diverse situations. Focus will be defined by the partners that are willing to work with Street Lab (the user group for their service offerings will define who they involve in Street Lab). The partnerships themselves should be relatively open: any partnership opportunities (provided they are willing and capable to provide a value-providing service) should be considered.



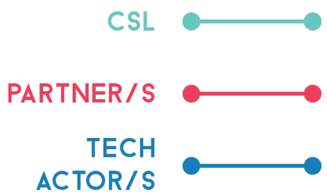

*[above]* Street Lab partnerships today

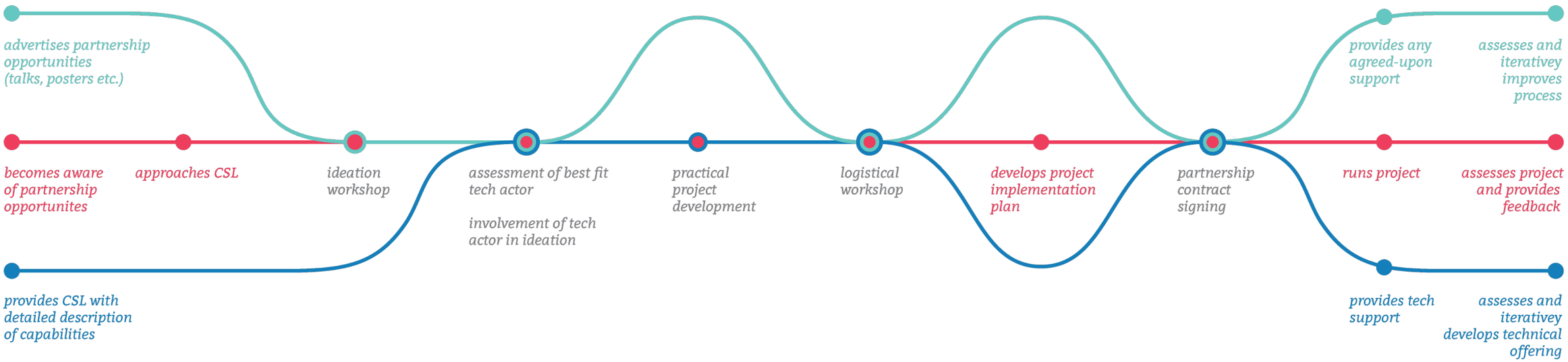



*[above]* A possible future vision of Street Lab partnerships

## *Partnership Journey*

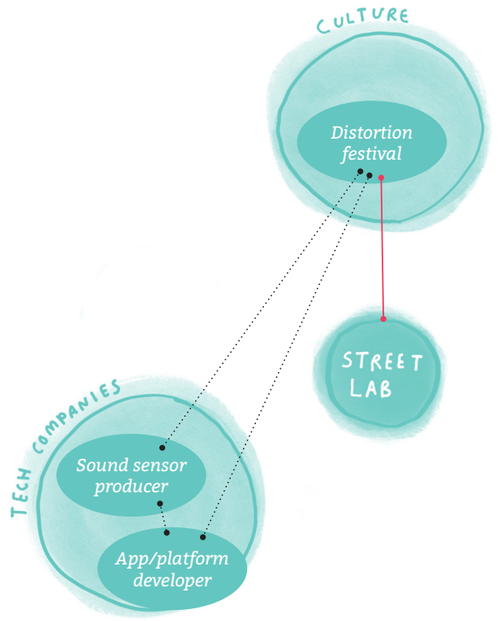
These three journey maps (one for the CSL, one for potential partners, and one for tech actors) show a vision of the generalized steps required to create new Street Lab partnerships. Note that the CSL would be required to facilitate two workshops: first to ideate with potential partners, and second to organize project logistics with partners and tech actors. Also note that in this version, the interested partner contacts CSL – but this could also be reversed, with CSL contacting potential partners first. Though not explicit here, there is the possibility that several partners and/or tech actors could collaborate on the same project. In these cases, the the singular journey lines shown here actually represent groups of partners or tech actors – who would go through the same generalized process together.



## *Example Case 1: Distortion*

Distortion is a street festival within Copenhagen, with various musical acts placed in the streets and crowds moving from act to act. Part of the festival takes place in downtown Copenhagen. A partnership with Distortion could be a good way demonstrate some smart city ideas in a fun and dynamic way, with a younger demographic. In the iteration proposed here, an urban sound sensor company could be involved, and festival-goers could preview the acts (and decide which area of the street to stand in) through data.kk.dk.




*user decides to attend Distortion festival*

*user opens Distortion web app and can view a map of the festival area, with areas of noise highlighted*

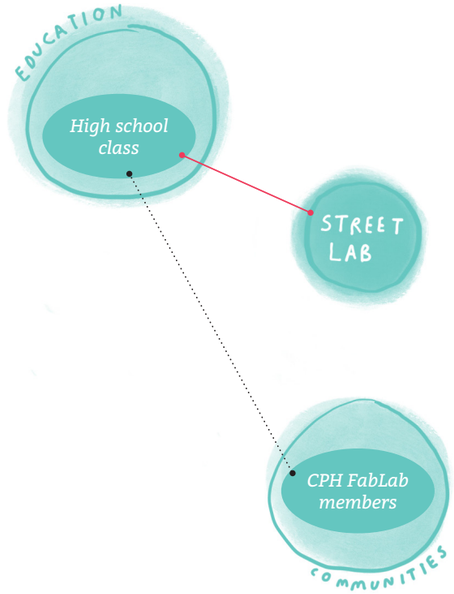
*user can tap on the highlighted noise areas to hear a live stream of the music in that area*

Concept was first decribed by the author and three collegues as part of a video prototyping course. See video and collaborators here: youtube.com/watch?v=by5hav_OcxY



## *Example Case 2: CPH Fablab + High School*

Copenhagen Fablab is a membership-based workshop space, stocked with 3D printers, laser cutting technology, wood and metalwork tools, and experts interested in creating things. This would be an excellent community to establish a partnership with, as their technical skill and 'maker' attitude is a good fit for Street Lab's experimental mandate. In the iteration here, CPH Fablab could enter an experimental partnership with a local high school class, helping them create experimental prototypes to test in Street Lab.



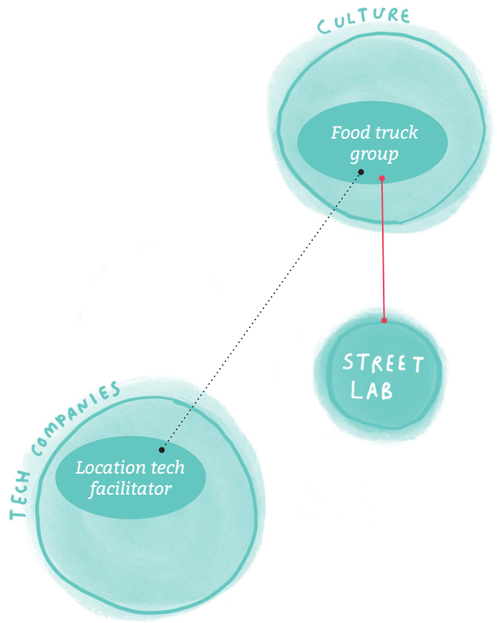

*students learn about an applicable subject (ex. the environment)*

*students meet with fablab actors and design simple experiments to prototype*

*experiments are installed in the street lab and results posted online*

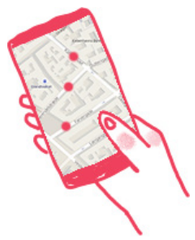
## *Example Case 3: Food Trucks*

A food truck event, where various food trucks park throughout a small area, could also serve to bring people into Street Lab, while demonstrating some smart city concepts. Currently, these types of events are often organized through facebook, and usually a google map is provided with pins where each food truck will be located. A similar kind of event could be organized in Rådhusplads and Vester Voldgade, drawing more people into the Street Lab map, and demonstrating a practical usage of the technology in the area. The food-truck map could be linked to a map of sensors and technology in the area, informing those at the event about Street Lab in a practical, approachable way.





*user reads about event through usual channels (facebook, AOK, etc.)*



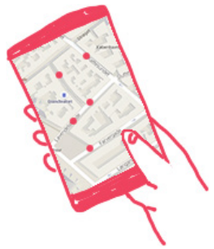
*at the event, map shows location of each food truck and extra information*

*map also shows Street Lab installations in the area (sensors, etc.)*

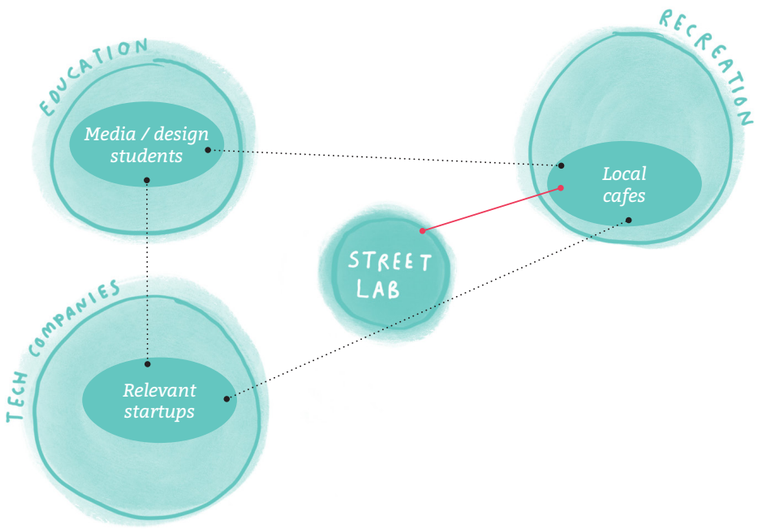
## *Example Case 4: Local cafes + Startups*

One way of engaging the local business owners in the Street Lab area could be through this partnership program. In the iteration shown here, a group of cafe owners within the area could be put in contact with student app developers or small startups, who could then work together to create a useful mobile tool. This tool could, for example, show off a daily menu, advertise free seats, or promote events.

*group of friends searches for cafe*



*using the app developed through this partnership, view available tables in the area*

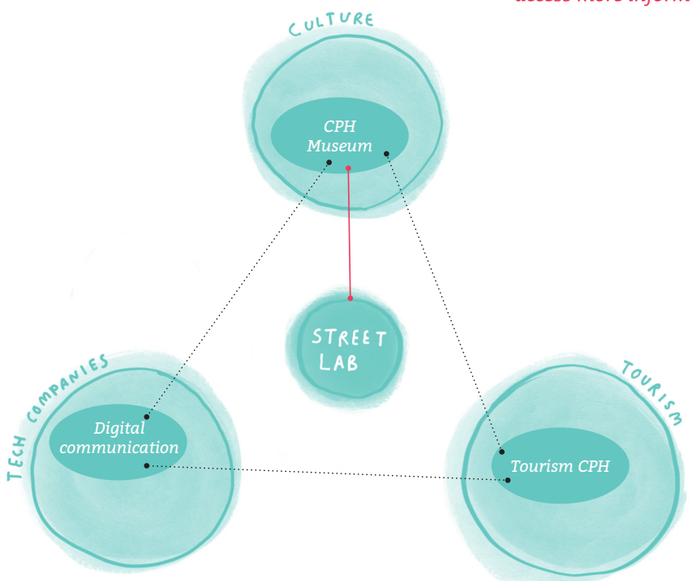


## *Example Case 5: Museum of Copenhagen*

The technical infrastructure being implemented in Street Lab provides a unique opportunity to experiment with new ways of disseminating digital information within urban spaces. Tourists provide a possible focus point. The free wifi in the area means that they will likely have mobile internet access, and the presence of several major attractions in the area provide logical points where more information would be welcomed. In the iteration shown here, tourists can use their phones to link to interactive information pages while being guided through the area.

*Tourist views dragon fountain in Rådhuspladsen*


*Tourist can scan small sign or use bluetooth to access more information*




## *Next Steps*

Initial steps could involve reaching out to the potential partners described here, and initiating some of these ideas. From there, a strategy for recruiting more partners, developing ideas with them, and supporting them while they implement those ideas, must be developed.

# INITIATION

The final level of participation in Street Lab would be for all kinds of users to have the power to suggest and implement projects. This step requires that the previous steps have occurred, and necessitates a strong strategic drive towards deep user involvement. It is important to note that this is not just a suggestion platform: users must be educated and supported to allow them to develop really innovative solutions, and this process should be available to all who express interest (citizens, businesses, schools, etc.).

## *Platform*

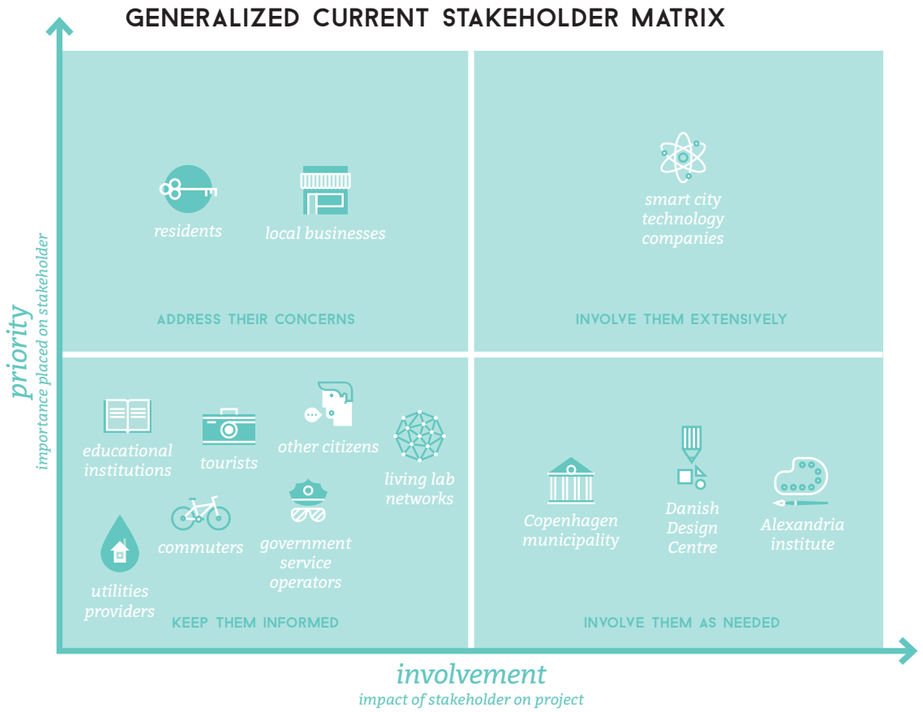
In ideal circumstances, Street Lab could become a hub of diverse stakeholder involvement through the creation of a centralized, inclusive, physical space in which users could associate with smart city development. Modelled after projects such as Citilab in Cornellà de Llobregat, the space should offer introductory instruction to all who desire it, as well as specialized workshops and programs for various demographics. One way to make this endeavor more manageable is to go with a 'popup' model - a temporary, pre-planned space. In this iteration, the involvement platform could exist for two months in middle of the Street Lab timeline, with activities planned in advance. Suggested here is a time period from May - June 2017 for the Street Lab Popup. This time period allows for a year of planning and organization, and a year to implement any ideas developed during the popup. The first steps of this planning process are exemplified here.

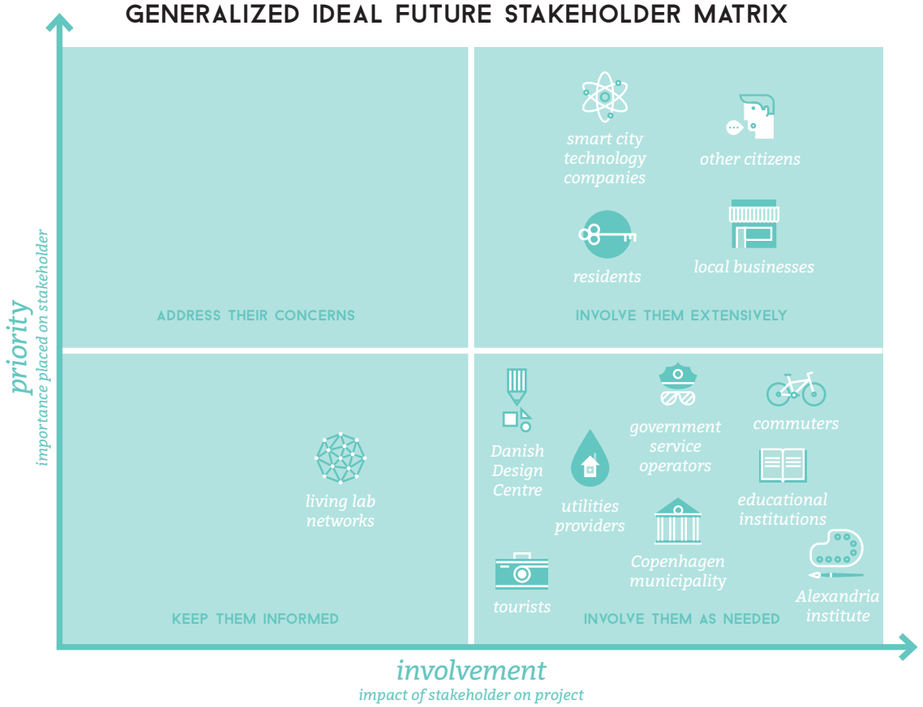
## *Who will this work for?*

The focus of Street Lab Popup would be to create as inclusive a space as possible. Of course, the draw of a centralized, open innovation space will be greatest for those who already have some interest in urban innovation (for example students or perhaps those already involved with the maker movement). Workshops and programs targeting certain demographics could help broaden this user base. As the space would be physically located in the Street Lab area, it would have special resonance with residents of the area.

Due to the limited time frame of the project, decisions about which stakeholders whose involvement should be prioritized will have to be taken prior to project initiation. While not ideal from a democratic perspective, this process can be made as coherent as possible by completing some deep stakeholder analysis and prioritization exercises. The initial steps in this process have been taken here.


*[above] this diagram highlights some of the potential components of the Street Lab participation popup.*



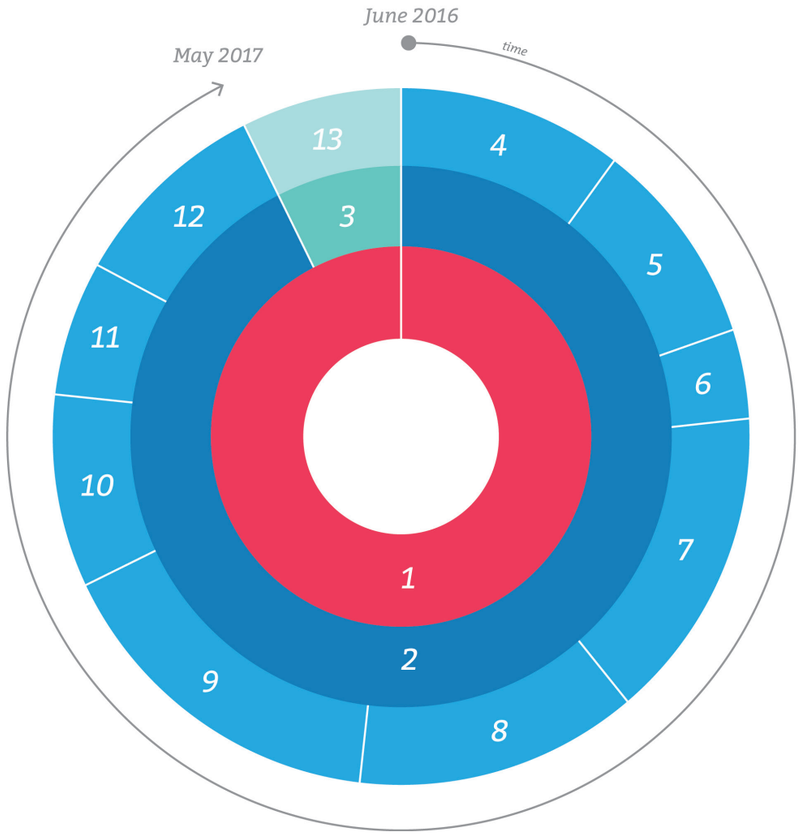




## *Stakeholder Prioritization*

The short time-span of this proposed involvement platform requires a high degree of stakeholder prioritization. Key strategic groups should be targeted with initiatives. In this way, the temporary pop-up can permanently shift stakeholder involvement according to overall strategic goals.

The two diagrams to the right show a very generalized, approximate overview of Street Lab's current stakeholders. They are mapped according to a stakeholder matrix, which shows how they are involved in Street Lab (from a project organizer's point of view). The top matrix shows the current situation, and the bottom matrix shows an idealized, more inclusive version.

These diagrams can help with the prioritization process, by pinpointing specific groups that should be shifted. For example, one important note is that residents, other citizens, and local businesses should all be moved into the 'involve extensively' quadrant. Initiatives that specifically target these groups will therefore help to shift the current stakeholder matrix towards the idealized version.




1. *Street Lab participation pop-up*
2. *Organization*
3. *Operation*
4. *Determine overall functional goals*
5. *Prioritize stakeholder involvement*
6. *Assess internal capabilities*
7. *Adjust capabilities as necessary (hiring, partnerships, etc.)*
8. *Plan components (programs, events, etc.)*
9. *Organize physical location*
10. *Create detailed schedule*
11. *Determine and implement publicizing strategy*
12. *Setup*
13. *Run Street Lab pop-up*

## *Next Steps*

There's no getting around that this is a large undertaking, and would require significant investment. It requires a fundamental shift in the strategy and goals of Street Lab – more towards inclusive, citizen-oriented smart city development. The popup nature of the space could help to minimize the cost, however.

The task breakdown diagram to the right visualizes some initial thoughts on the steps required to organize the Street Lab pop-up. It could serve as a starting point for discussing how to take on this task.

# TIMELINE + CONCLUSION

Ideally, all three of these idea categories would be rolled out, as the concepts support each other. Place branding will bring attention to any platform, and partnerships will help to diversify the participation offerings. Of course, in reality, time and funding are limited, and therefore each idea category can also stand alone. Even just a partial implementation of the thoughts outlined here could make a real impact in increasing the inclusiveness of Street Lab – and harnessing the true potential of an urban living lab.

***Phase 1**: Awareness*

***Phase 2**: Participation*

***Phase 3**: Initiation*

*[below] A rough timeline has been created here, showing when each initiative would optimally be implemented.*