SIDEWALKS OF OSLO:
Rethinking ordinary with systemic design

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OSLOMET

"...more than ever, the city is all we have..."

(Rem Koolhaas, 1995)

Abstract

Sidewalks play a central role in pedestrian infrastructure. Designed for walking, they are known to be the healthiest mode of transportation for individuals. However, our experiences reveal that the physical environment impacts our mental state while walking. This project aims to investigate the barriers and drivers that pedestrians encounter, and explores the underlying motivations behind them. In the context of Oslo, the study raises questions about how a city should plan and manage the transition towards more promising modes of transportation. Additionally, it emphasizes the significance of understanding the surrounding context of sidewalks to create a more enjoyable pedestrian environment. This project is built upon two fundamental principles. Firstly, it declares the urgency to address climate change and prioritizing sustainable transportation in urban areas. Secondly, it acknowledges the importance of promoting mental and physical well-being of society. To tackle the complexity, a systemic design methods are adopted. This framework enables an examination of the pedestrian microsystem in relation to various external factors. It facilitates the identification of conflicts, such as feedback gaps, and guides the analysis of data. Findings serve as a starting point for discussions. Through the implementation of four key concepts, Oslo takes on the role of a facilitator in shaping a resilient future strategy for its citizens. By actively pursuing these concepts, the city strives to enhance the pedestrian experience and promote sustainable transportation methods.

Keywords:
Participatory processes, Interdisciplinarity, Systemic design, Systems thinking, Giga mapping, Social sustainability, Infrastructure, Transportation, Public space, Urban development, Walking, Well-being, Walkability, Strategy, Sustainable development

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1 INTRODUCTION

Situation of interest

Author's Note:
My interest in city dynamics and their visual aspects has been a significant motivation for this project. Growing up in a small village in Slovakia, I have cherished memories and strong emotional connections with my neighbors and community. However, since leaving my home country to pursue my studies, I have resided in cities. The contrast between what I once considered natural and the complexities I encounter in the city formed my viewpoints. Through my education, I have been given the opportunity to explore and refine design methods that allow me to better understand and articulate my personal and academic perspectives. In this project, I have chosen to delve into the essence of my own intuition through the most instinctive form of movement – walking.

Environment
The focus of this project is to initiate discussions about the context surrounding walking. The built environment is created for us, and it carries inherent values reflected in our behaviors. Our actions and emotions shape our future experiences.

Presence
What factors contribute to the enjoyment or frustration while walking? How can sidewalks be designed to bring happiness to people? These questions are further investigated through data collection from citizens. The systemic analysis provides insights into the various factors that influence our behavior.

Walking
We experience sidewalks though walking. While commuting to school or work may seem straightforward, it encompasses multiple layers of significance. Mäkelä describes how unintentional events intertwine with intentional during the creative process (Mäkelä, 2016). This perspective acknowledges the inclusion of both aspects in the process. By considering a person's movement from point A to point B as a dynamic "process," it becomes possible to identify qualities and identify any missing elements. The journey itself can encompass both serendipitous and purposeful moments, harmoniously merging together.

Urban indicators

Peter Norton discusses the "phone zombies" phenomenon in an article for The Globe and Mail (Norton, 2018). In Stockholm, signs were installed to warn pedestrians about the dangers of crossing streets while looking at their phones (see Figure 2). These signs targeted various stakeholders in the city's transportation system. They served as a critique of inattentive pedestrians, a reminder for car drivers to exercise caution and reduce speed, and a call for systemic changes within organizations to address the issue. This example demonstrates the potential of systems thinking in problem-solving, as it challenges the inclination to assign blame to a single party.

In Oslo, signs with the title "No loitering" are placed in public areas, including metro stations. According to the Cambridge Dictionary, loitering refers to lingering with the intention of engaging in illegal activity (Cambridge University Press, 2023), but it can also signify to behave freely. What message does this convey to people? Are there other interpretations that pedestrians might have that influence their behavior? These questions raise the importance of considering the psychological effects on individuals.

Figure 2 - Signs in Stockholm (Nackstrand, 2016)

Figure 3

Background

Several research projects have focused on the themes of participation and walking. One example is the Hovinbyen Sirkulære Oslo project initiated by Pådriv (Hovinbyen Sirkulære Oslo, 2019). It aims to transform an eleven-square-kilometer area in Oslo into a sustainable city operating on the principles of a circular economy. The project envisions the future integration of new residents and the creation of numerous job opportunities by 2040. It serves as an illustration of how complex systems can be structured to achieve specific sustainability goals and promote a particular economic model. Multiple stakeholders, including organizations, real estate developers, investors, and companies, are actively involved in this initiative.

Another organization directly responsible for sidewalks, is The Agency for Urban Environment (Bymiljøetaten, 2018). This agency is involved in various initiatives, which includes improvements of walking. Their activities encompass rehabilitation projects, changes to public spaces, and initiatives targeting specific user groups. To gain a better understanding of the design approach and the contextual factors related to sidewalks, the project referred to the Street Design Manual (Bymiljøetaten, 2018) and Oslospeilet (The Municipality of Oslo, 2020), both publications by the agency. In 2019, the Municipality of Oslo commissioned an international consulting group, COWI, to conduct a study identifying areas in Oslo that are suitable or unsuitable for walking (The Municipality of Oslo, 2020). In Figure 4, the areas unsuitable for walking are marked in red, while the green areas represent suitable ones. For additional inspiration, the project drew insights from Active Design: Shaping the Sidewalk Experience, a design manual developed for New York City that emphasizes the experiential aspects (New York City Department of City Planning, 2020).

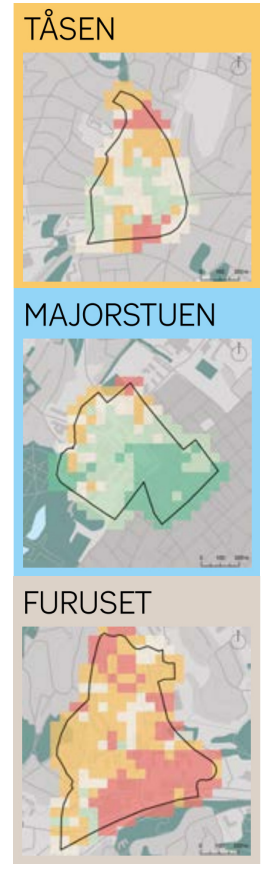


Figure 4 - Study developed by COWI in 2019

At the beginning of this report, Rem Koolhaas's quote underscores the significance of urbanism. Within cities, one of the challenges lies in reaching a consensus on common goals, and the allocation of space for various structural components. The Arrogance of Space Mapping Tool, developed by Duris (Duris, 2019) in collaboration with Andersen (Colville-Anderssen, 2019), addresses this issue. This tool, created for the Cycling Coalition, utilizes an aerial view of the city's space and assigns a grid to it. By color-coding the squares, it indicates which areas are designated for specific purposes. This approach provides a straightforward means of assessing how different structural units utilize urban space. These topics, alongside other themes, are explored in this thesis.

An example of the offerings provided to citizens by existing initiatives, project is PALMA and its "maps for pedestrians" depicted in Figure 5 (Corwin, 2020). These maps are designed for citizen use and provide a range of routes based on their characteristics or purposes, such as maps focused on parks, sports, or relaxation. This initiative presents an intriguing opportunity for exploration during the research phase.

Another noteworthy initiative involves suggestions for Sunday walks in Oslo, which are provided through recommendations on the official website for visitors and citizens (Oslo Visitor Centre, 2023). Investigating the research processes that underpin such recommendations could be a valuable inspiration.

Figure 5 - Maps for pedestrians developed for the PALMA project in Bratislava (Slovakia) by Corwin

Research question

Main research question:
How can systemic design change the way sidewalks in Oslo are designed?

The main research question focuses on the potential of systemic design to transform the "status quo" of sidewalks in Oslo. It seeks to explore how adopting this approach can bring about positive changes in sidewalk design and their overall impact.

Supportive questions:
What existing documentation and factors influence the design and characteristics of sidewalks? What feedback could be added?

This question seeks to identify and analyze the various documents, guidelines, regulations, and other factors that shape the design and development of sidewalks in Oslo.

What are the barriers and drivers that impact people's walking experiences on sidewalks?

The focus is on exploring the factors that either facilitate or hinder pedestrian movement on sidewalks, considering aspects such as infrastructure, accessibility, safety, and user experience.

Target audience

People

The individuals residing in Oslo, referred to as pedestrians or users, play a crucial role in this project as they possess firsthand experience with sidewalks. The project aims to engage them as co-creators by focusing on their daily actions and ordinary travel routines.

Organization

Alongside citizens, various agencies and organizations responsible for funding, designing, and implementing sidewalks are also considered a target audience. These entities serve as both researchers and initiators of changes. Due to project time constraints, user testing was not feasible, so discussions with The Municipality of Oslo were held to gauge the feasibility of the proposed concepts.


@palmapreludi
50 Things to Do in the Urban Wild
Clare Gogerty
296 143
CHARLES MONTGOMERY HAPPY CITY
EMOTIONAL DESIGN
WHY WE LOVE (OR HATE) EVERYDAY THINGS
Jan Gehl
LIFE BETWEEN BUILDINGS
Arkitekturopprøret

Project network and workspace

Established network

Establishing network was important in navigating the complex field. Figure 6 illustrates the composition of the discussion team, diverse organizations that contributed to the project in various capacities, and contacts who were not further involved in the project's development.

Workspace

Creating suitable workspaces was essential for facilitating the project's progress. The majority of the time was spent in shared group rooms at OsloMet University campus in Oslo, fostering an inspiring learning environment by interacting with fellow classmates. Public libraries and sessions at the OsloMet campus in Kjeller were also used as a workspace, while the convenience of working from home became more prominent as the project neared completion.

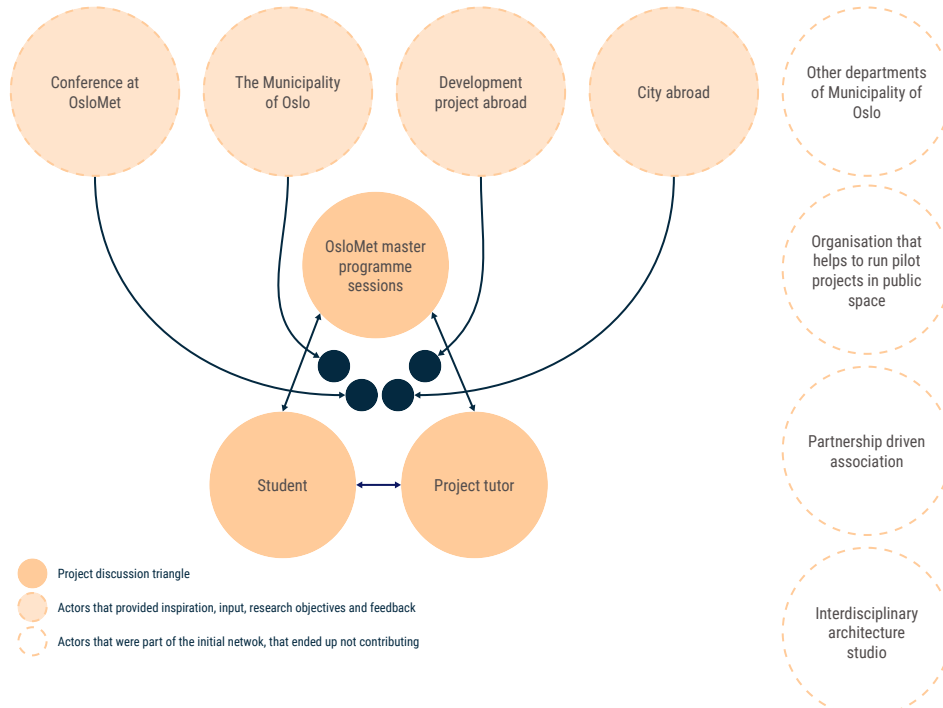


Figure 6 - Network of organisations

Project design

Systems-oriented design was originally derived from systems engineering (Hall, 1962). In Figure 7, project design model was fabricated with the inspiration from engineering (Haik et al., 2018). Experienced during studies, interdisciplinarity appears to be helpful when developing new models.

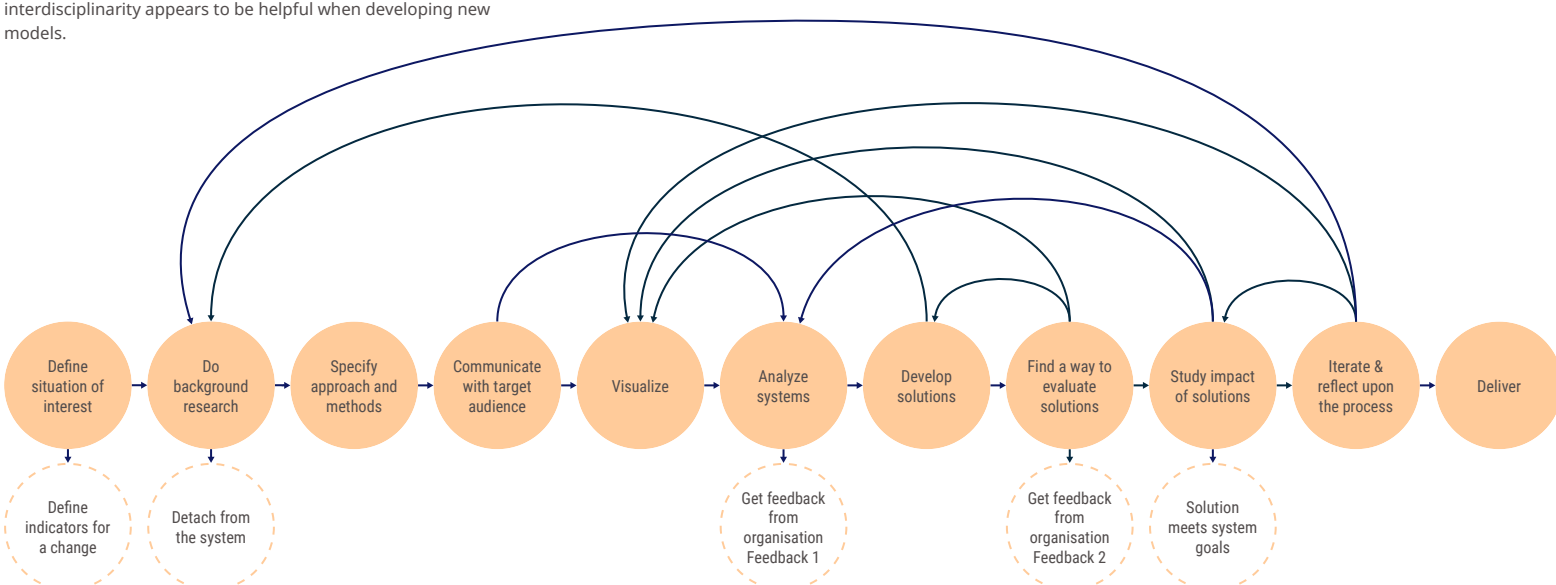
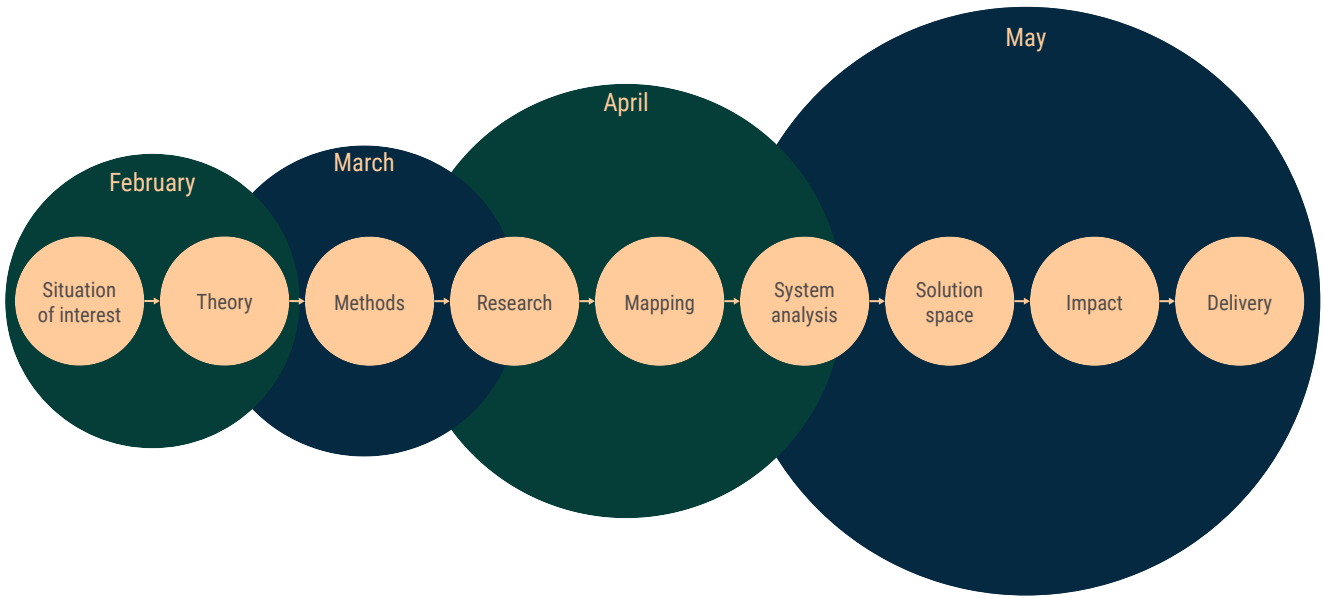


Figure 7 - Project design visualization

Progression plan



Privacy

The project was registered and approved by the Norwegian Agency for Shared Services in Education and Research (Sikt-Kunnskapssektorens tjenesteleverandør, 2023) to ensure compliance with personal privacy standards for collected data and information. This legal perspective prompted considerations on data handling and the need to safeguard the privacy of participants. Subsequently, the project's methods were refined to provide unidentifiable participant data, striking a balance between capturing human intuition and respecting privacy rights. The process of handling data provided insights into the project authors' involvement in the "observatory" or "experiential" practice. Early preparation of survey questions, conducted well in advance, helped situate future research within its context and facilitated the planning of the exploration journey.

2 THEORY

Urban space

Philosophy in architecture

Jan Gehl's publication, "Life Between Buildings," emphasizes that cities are ultimately meant for people (Gehl, 2011). Gehl and his team advocates for humanistic design approach, and care for citizens. Their work inspires a shift in the way spaces are designed. In TEDxKEA talk, Gehl explains how understanding psychology has influenced his thinking (Gehl, 2015). There is the need to investigate the consequences of design actions and ensure they align with the needs of people using the spaces. A concept of human scale is introduced.

The effect of modernism and the dominance of cars have led to urban infrastructure that is disconnected from the human scale. As a result, the 12 criteria are developed in architecture to pursue quality in the urban landscape (Gehl, 2010). They were adapted for this project in Figure 9. It is inevitable that designing cities with a human scale in mind is crucial for creating healthy and livable environments (Gehl, 2013). The focus should be on developing spaces that bring joy and comfort to people, and this requires a careful approach from urban planners, developers, and architects. Architecture should be a harmonious interaction between form and life, considering walking paths and the perceptions and experiences of their users. These principles serve as a foundation for nurturing innovative concepts.

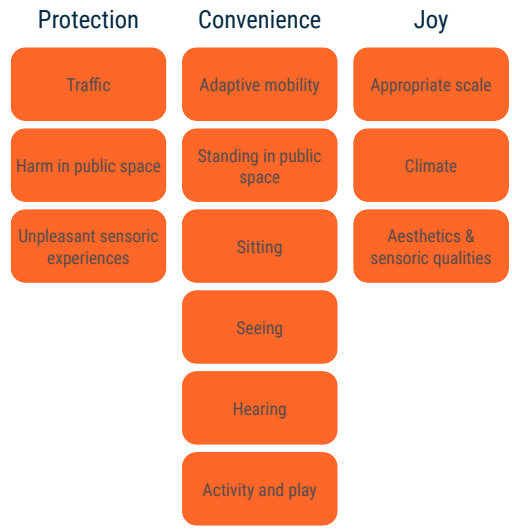


Figure 9 - Adaptation of the 12 criteria from Gehl

Urbanism

Attending the Nobel X conference in Urbanism at Oslo Metropolitan University provided valuable insights into current research projects, methodologies, and approaches. A significant influence came from Peter Norton of The University of Virginia, who presented a concept refered to as a "radical revision" (Norton, 2022). This transformative idea redefines the relationship between urban development, the automotive industry, and technological advancements, greatly impacting transportation evolution. With a direct impact on pedestrian movement on streets. Norton's proposal highlights the need for a new revision in urban priorities, particularly in transportation, as a promising starting point.

Art

British architect Peter Cook has shown his way of imagining architecture through paintings and sketches. One of them is in Figure 10 (Meyer, 2022). His visions give space for this new dynamic and exciting dimension we seek. Moreover, it is not just the visual character here but the ability to see beyond the ordinary.

To understand people, design should be adaptive and responsive to contemporary life. For example, Einar Sandvold, a Norwegian artist, paints cities (Sandvold, 2019). His paintings (see Figure 11) use colors and introduce buildings as organic structures in even or uneven shapes, with animate elements emerging from the scene. It engages to see and imagine the context and surroundings of our being in a divergent setting.

Figure 10 - City landscapes "Filter city" by Peter Cook

Figure 11 - Forvrengt lanskap 06 by Einar Sandvold

"The straight line leads to the downfall."

(Friedensreich Hundertwasser, 1953)

Design

Design for all

The term "universal design" is being part of urban development projects in Norway. Originally derived from designing for accessibility for people with disabilities, it has evolved to encompass the needs of all individuals, irrespective of their life situation, age, or physical abilities (Persson et al., 2015). This inclusive concept, as depicted in Figure 12, encompasses seven principles. In the context of this project, universal design goes beyond physical considerations and addresses how the city's mindset can foster inclusivity, focusing on aspects that are relevant to all citizens and affect us collectively, such as embracing tolerance for errors and promoting intuitiveness in the built environment.

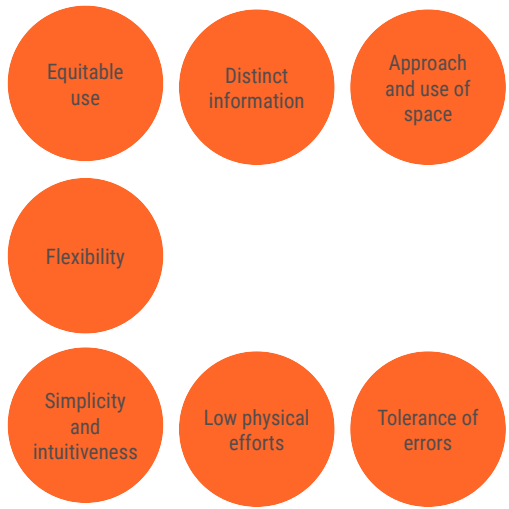


Figure 12 - Seven principles of universal design

Participation

To pursue universal design, we must understand users and the organization (Bischoff, Jany, 2018). A good approach is to make people contribute to decision-making through different activities. The participatory process includes many methods how to involve people. The goal is often to create discussions over decisions and to have a clear goal. Such an approach has been an inspiration for this project.

Design for Experience

Context is an important feature in designing products and services. Attachment and psychological factors between the product and the user enable long-lasting solutions (Gulden & Moestue, 2011). For example, an attachment of a citizen to walking as an activity, or the contextual factors of his walk could possibly create a long lasting relationship.

Complexity

Understanding systems thinking and its role in analyzing complexity can be challenging, but according to Meadows, it is a valuable tool for gaining fresh insights (Meadows, 2008). By merging technocratic principles with the dynamic nature of feedback, it offers a way to envision the future. This approach proves advantageous in navigating the complexities of the journey, and Figure 13 serves as a visual representation of this concept. It became a "first aid kit" to follow up on systemic analyis.

In the final chapter, Meadows discusses the relationship between quantity and quality. She emphasizes that prioritizing quantity often leads to an increase in quantity, but it may overlook the intangible aspects that truly make a difference. These hidden elements of quality, which are difficult to measure, and the relationships that contribute to it, deserve attention.

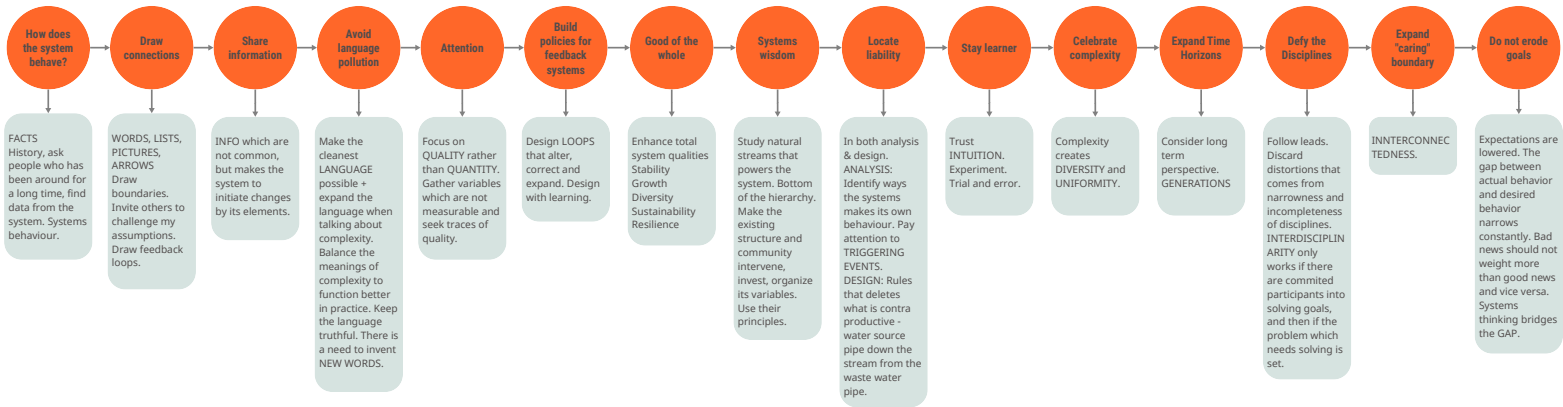


Figure 13 - Visualization of how to work with systems (Meadows, 2008)

3 METHODS

Data collection

Data collection

The initial phase of the research aimed to understand factors influencing pedestrians by combining both quantitative data from statistics and qualitative data from interview and surveys. A literature review was conducted to gather existing design manuals, national strategy documents, and relevant literature on walkability, with a focus on gathering persuasive arguments rather than simply listing data (Rudestam & Newton, 1992). Additionally, the research adopted a variation of the Macro, Meso, and Micro scales commonly used in systemic design (Sevaldson, 2022) to categorize information.

Macro

This level encompasses information on the national scale that influences the situation of interest, including underlying causes of events within a broader context. The research primarily involved desktop analysis of work conducted by research institutes and other organizations in Norway.

Meso

Information at the meso level pertains to Oslo and its urban system, including infrastructure and design approaches. It also incorporates rules and guidelines specific to Oslo. This stage involved studying existing documentation and rules, as well as engaging in conversations with relevant agencies at The Municipality of Oslo.

Micro

This scale focuses on pedestrians, their perspectives, and opinions towards environment in which they walk. To gain these insights, a survey was conducted. Gathering the perspectives of pedestrians served as a valuable resource for understanding everyday experiences.

One of the sources of inspiration for this project was a Blakerstiftelsen scholarship received from Oslo Metropolitan University. A 5-day trip to Barcelona was funded, and offered a unique opportunity to explore a different context. During the trip, documentation primarily consisted of photographs, voice recordings, and diary notes. An interview was conducted as part of the feedback process upon returning from the trip.

Data envisioning and organisation

Sevaldson (2011) introduced gigamapping as a powerful visualization tool to comprehend the intricacies of complex systems. Gigamapping allows the aggregation and organization of super-complexity, enabling the audience to easily read and grasp the information it presents. For the purpose of this project, traditional materials such as paper, markers, and posted notes were employed to create the project's maps. However, as the process evolved, these analog tools were upgraded to a digital version of the gigamap, which served as a backdrop during discussions. The whole project on a gigamap can be found in the appendix. To facilitate report writing and digital visualization, an online platform called Miro (Miro, 2023) was utilized.

Data analysis

A significant portion of the project was focused on systems. Systems thinking recognizes that each project necessitates a specific set of tools and models in the creative process (Jones & Ael, 2022). Although the creative process initially appears boundless, it results in a refined framework (Sevaldson, 2022). A systemic design toolkit offered numerous valuable models for navigating systems understanding (Jones & Ael, 2022). The following outlines the steps and models utilized in the analysis:

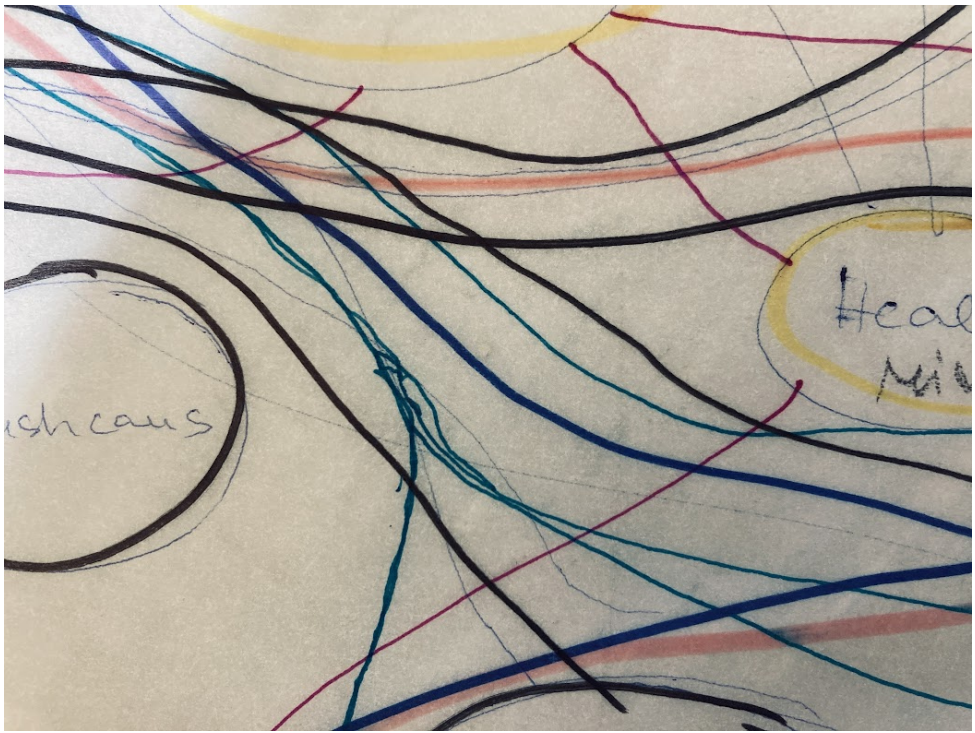
The system boundaries were established, drawing connections to wicked problems (Sweeting, 2019). These boundaries were derived from research, urban indicators, and behavioral patterns or actions observed in the streets within the context of interest. Subsequently, an actor map (Jones & Ael, 2022) was constructed to illustrate the structure encompassing sidewalks, followed by an examination of their interrelationships, which was supported by discussions with the municipality of Oslo. As the next step, a conversation was initiated about the events that lead to specific actions, employing a systemic adaptation of an iceberg model (Jones & Ael, 2022). Arrows were incorporated to depict the relationships between these events. This approach was instrumental in zooming out and addressing the underlying causes of events at the systemic level.

To initiate the design process, the visualization of a micro systems loop was employed, illustrating the journey of pedestrians (Cook, 2011). A list of variables that can influence this loop was compiled using the 5 Ws approach, commonly used in project management (Adobe Experience Cloud Blog, 2018). This process aided in categorizing the experiences of users into factors that drive or hinder walking. It served as a foundation for the ideation process and the determination of quality, following a similar approach as that of The Municipality of Oslo.

Next, the relationships between the micro system of pedestrians and research-gathered factors were established. Additionally, a ZIP analysis was conducted to identify potential intervention points within the system (Sevaldson, 2022).

Moving towards envisioning and framing desired futures, overall goals were positioned within a value proposition diagram (Jones & Ael, 2022). This enabled an understanding of different aspirations for society, organizations, ecosystems, and individuals. Many of these tools served as an exploration of themes in different directions within the system. While each tool, if utilized separately, could generate initial solution ideas, the purpose of using several tools was to observe how the breadth of understanding and knowledge could shape the outcomes and facilitate new analytical processes.

Design process



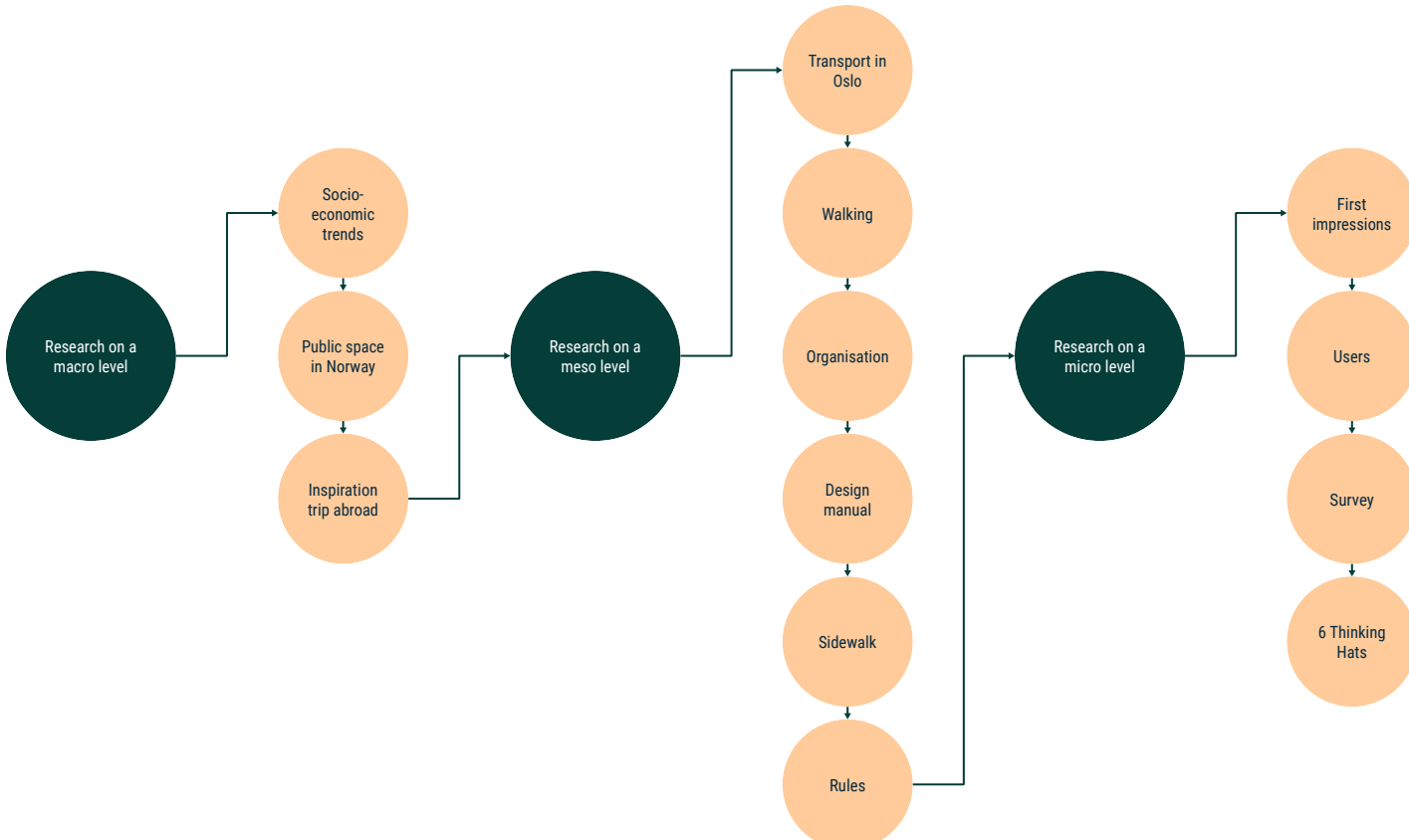
Design process

The solution space starts with the formulation of an intervention strategy, which incorporates connection lines to depict relationships (Jones & Ael, 2022). This strategy diagram draws inspiration from the leverage points developed by Donella Meadows and proves essential in identifying various levers for future concepts (Meadows, 2008). Consequently, four concepts were generated. Through individual concept development and additional research, a range of suggestions and visuals emerged.

Given the relatively broad nature of the concepts, it became crucial to explicate their impact within the existing system structures. To achieve this, their presence was visualized within the previously established intervention strategy. A timeline was crafted to estimate future implementation. Their intensity within levers was mapped and lastly, they were integrated into the framework of the studied system by visualizing. The outcomes of the systems analysis were then discussed with a representative from The Agency of Urban Environment.

4
RESEARCH

Research approach



4.1 Macro

Socio-economic trends

An analysis of social trends that influence transportation was published by the Institute of Transport Economics in the Norwegian Centre for Transport Research (The Institute of Transport Economics - Norwegian Centre for Transport Research, 2018). These trends provided a broader contextual framework when examining the causes of events, values, and future aspirations for concepts. As described, it is anticipated that these trends will trigger a series of reactions and events in society. Figure 16 presents a list of these trends, with arrows illustrating their mutual influence.

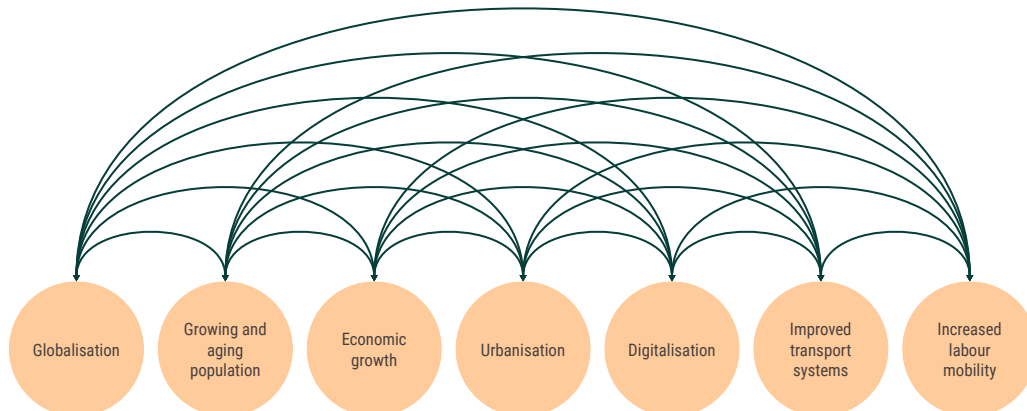


Figure 16 - Social trends in Norway (The Institute of Transport Economics - Norwegian Centre for Transport Research, 2018)

Public space in Norway

A handbook for public spaces in Norway, which exemplifies the national approach to the quality of public space, turned out to be a good resource to assess strategies (Kommunal- og moderniseringsdepartementet, 2019). Figure 17 visualizes the five criteria design outlined in the handbook. This master project compiles criteria from various disciplines that were developed to guide the design process of spaces or products.

An emphasis was placed on how the handbook defines quality. It is perceived as a combination and synergy of various conditions. The importance of citizen involvement in the design and decision-making processes is mentioned. This dialogue aims to elicit as many viewpoints as possible from the citizens. Demographic research appears to exert a substantial influence on the social environment. Another critical aspect is the collection of quantitative data, particularly when it comes to the attractiveness and comfort of public spaces, which often necessitates qualitative data. This opens up opportunities to explore alternative methods that foster a dialogue between the organization and the citizens.

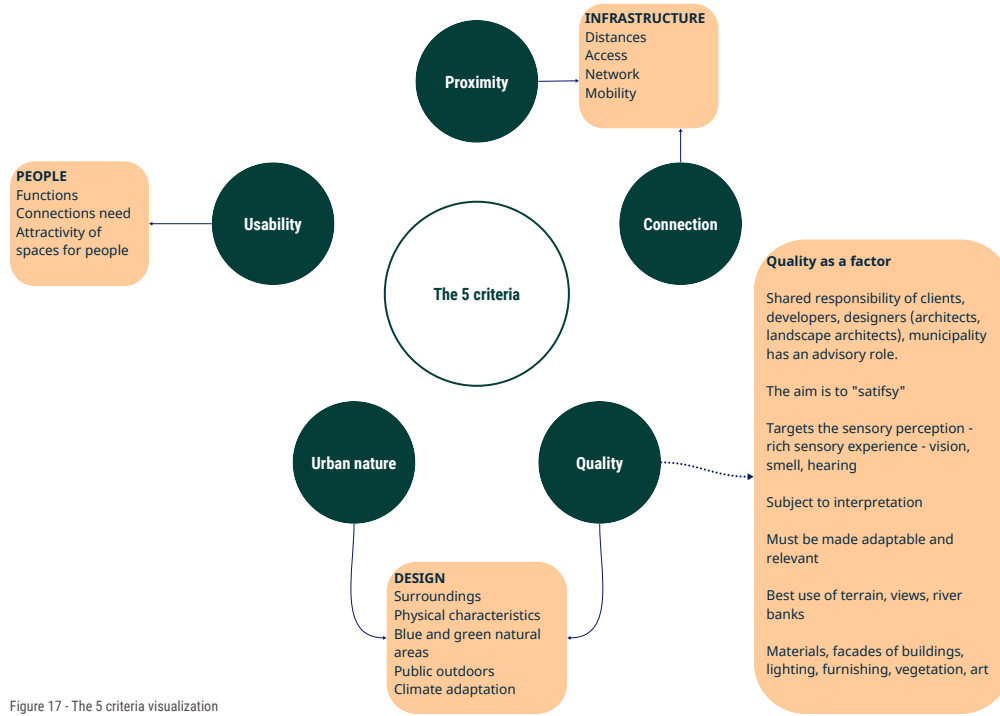


Figure 17 - The 5 criteria visualization

Inspiration trip

Barcelona

An essential source of inspiration was a trip to Barcelona, which was made possible by the Blakerstiftelsen scholarship. Barcelona was chosen due to its unique urban structure and numerous initiatives aimed at transforming public spaces into people-friendly. Being immersed in the outcomes of these changes evoked strong emotions and served as a driving force for transformation within the context of Oslo. Switching roles from a researcher to a user, and vice versa, was also a compelling aspect. The primary focus was on absorbing the natural street environment. Given that this trip occurred at the project's early stages, it proved to be a valuable method for understanding the specific context of interest. Being placed in a different setting facilitated the ideation process.

El Poblenou

El Poblenou, a district in Barcelona, which translates to "new village" in Catalan, originally consisted of industrial and working-class residential buildings. However, after the 1992 Olympics, an extensive transformation process began. The residential spaces expanded, and the public areas were developed to prioritize leisure, sports, and social life, with a strong emphasis on citizens and pedestrians as the primary users. This environment provided a suitable space for experiencing public space, given its significant transformation.

Several studies have been conducted in the Poblenou district. One notable study involved a group of researchers conducting an acoustic analysis of the area through a soundwalk approach (Alsina-Pagès et al., 2021). Various sound-producing elements, such as wind, footsteps, bird sounds, and car horns, were observed and analyzed. It is worth highlighting that this study served as one of the research components for a broader holistic investigation, exemplifying how different qualities of public spaces can be explored and measured.

Architectural viewpoints

A session with Adam Gebrian, a Czech architecture critic, at the CAMP - Centre for Architecture and Metropolitan Planning in Prague provided valuable reflections on Barcelona (Gebrian, 2018). Gebrian shared his comments and experiences from his three-year residency in Barcelona, and these thoughts formed part of his work for an online television. Some of these insights served as guidelines for the trip. It is important to note that the following points are based on the architect's personal and professional experiences. Here are some key takeaways from the session:

- The presence of numerous single-seat benches along the streets provides convenient resting spots for individuals who are alone.
- Different ways of experiencing streets, such as crossing them with a baby stroller, carrying luggage, or playing with a ball, offer unique perspectives.
- The city offers remarkable barrier-free access throughout, creating a natural and inclusive environment.
- The utilization of areas around sidewalks, such as front niches of shops for seating and enjoying ice cream, adds an exciting dimension to the cityscape.

These observations offered valuable insights into the urban fabric of Barcelona and its impact on the experience of its inhabitants.

Gebrian also mentions the importance of providing spaces for shelter during rain showers at playgrounds. These reflections prompted considerations about the facilities offered in Oslo in relation to weather events. In comparison to Barcelona, there is a notable lack of playgrounds in Oslo. Another interesting example presented is the use of irrigation tiles on San Joan street, demonstrating sustainable development practices (Gebrian, 2018).

Documentation

Data collection for the project primarily involved the use of photographs and notes. Photographs were taken to capture insights and the atmosphere of public spaces, while behavioral information was documented through note-taking. Gathering feedback from people on the street proved impossible due to language barriers. Some reflections and thoughts were compiled in a travel log. Upon returning, these reflections were visualized, as depicted in Figure 18.

Key observations and facts include:

- The importance of not attempting to surpass nature and instead learning to appreciate and work harmoniously with it.
- The need to cultivate a perspective that looks "beyond" and embraces broader possibilities.
- The value of maintaining a sense of playfulness in urban environments.
- The significance of decorations in enhancing the ambiance of public spaces.
- Manifestations in architecture can serve as a means to communicate and explain fundamental aspects of life.
- The recognition that urban environments must be continuously adaptable to meet evolving needs.

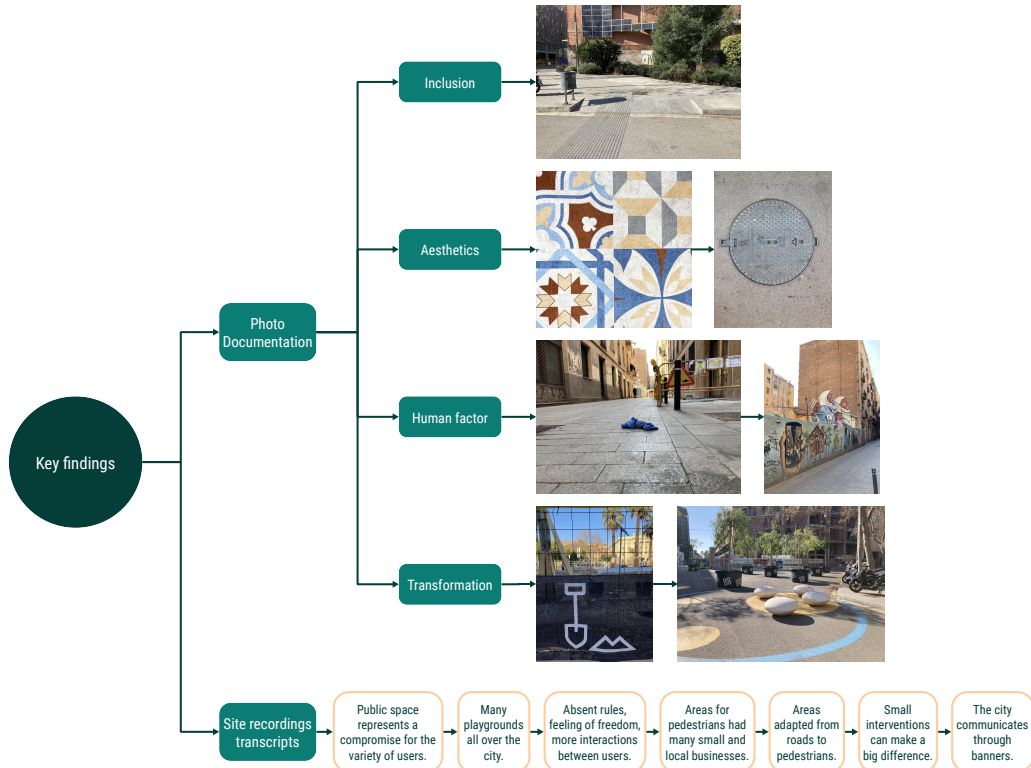
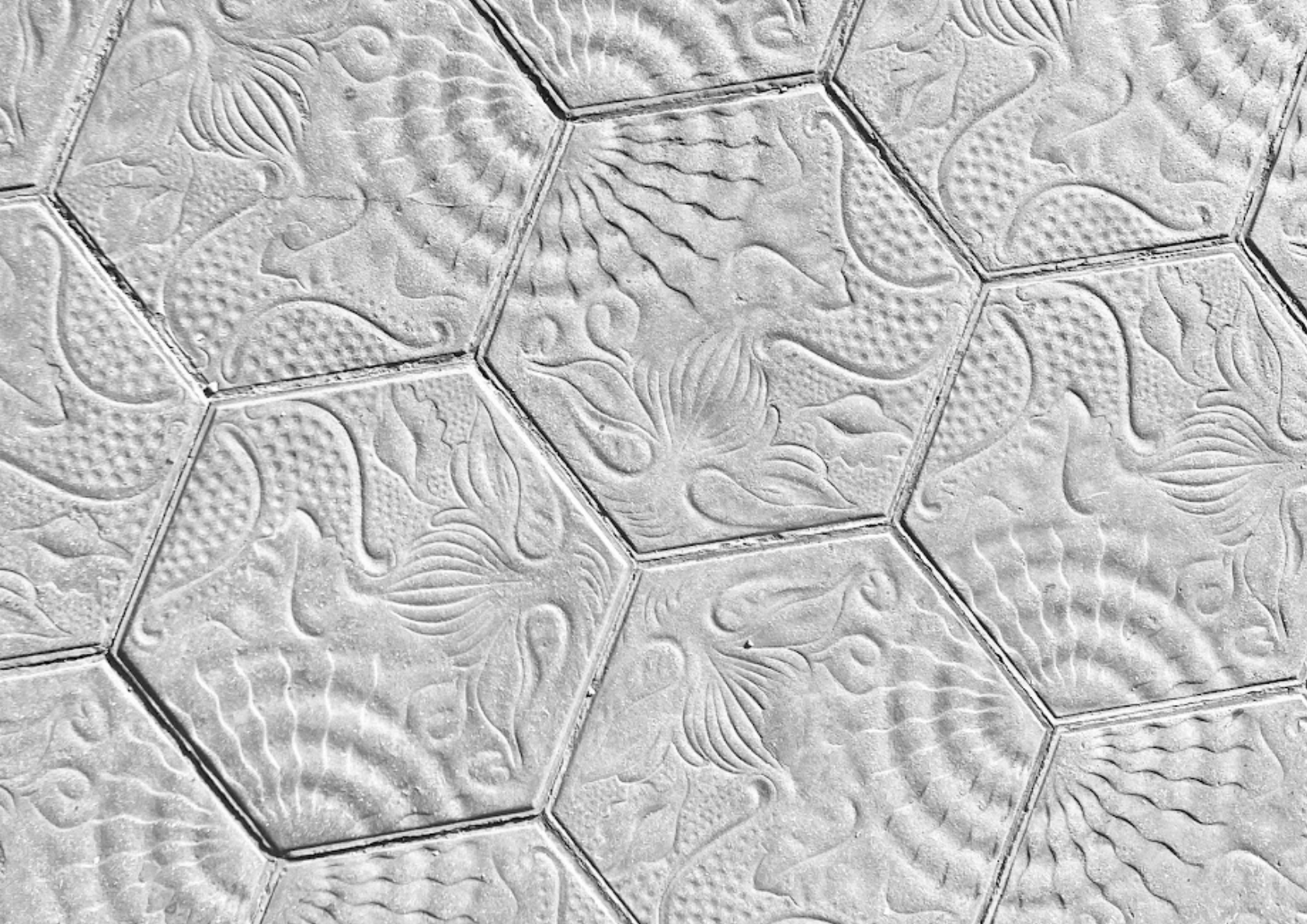


Figure 18 - Visualization of findings from the trip to Barcelona



Interview

Understanding the values and purposes of sidewalks requires an examination of the contextual drivers that influence pedestrian behavior. To gain insights into this, an interview was conducted with an exchange student from Norway who was studying in Barcelona (referred to as the participant).

During the interview, the principles of conversation theory developed by Gordon Pask were applied (Pask, 1975). According to this theory, conversations are triggered by participants who have specific goals and follow a particular architectonics (Pangaro, 2017). In this project, the incidental continuation of themes played a significant role in co-creation.

By zooming out and considering the project's area of interest, sidewalks can be viewed as platforms of action. In this context, conversation theory provides an approach to examine the interactions between pedestrians and their surroundings. Figure 19 depicts a photograph of a street in Barcelona, providing visual context for the discussion.

Overall, conversation theory serves as a valuable approach for interviews, to explore the dynamic relationship between pedestrians and their environment, and the true events that they experience.

Pask also introduced the concept of "togetherness". This term refers to the sense of connection and meaning that arises from being in proximity to others, whether through talking, dancing, or meeting. Togetherness can be exemplified by settings like a dining table or a cafe, which serve as tools or platforms for fostering this sense of connection. Similarly, sidewalks can be considered such setting. Pask regarded togetherness as a fundamental aspect of civilized life (Pask, 1981). On a philosophical level, sidewalks can be envisioned as platforms for temporary togetherness. Despite our differences, such as varying walking speeds, moods, distances, purposes, or companions, we all share sidewalks at different moments of our day. Sidewalks serve as common ground that transcends individual identities, providing a space where people come together in their daily journeys.

Figure 19 - Old town street in Barcelona

The interview aimed to initiate the conversation with an opening question and then delve into various themes throughout the discussion. The visualization presented in Figure 20 was inspired by the themes explored during the interview with the participant. It illustrates how the principles of conversation theory, as outlined by Pask (1975), shaped and evolved the discussion. Each theme is represented by a different color, and the visualization highlights the contextual factors that influence the decision-making process (Gulden, Moestue, 2011). This visualization served as an inspirational tool when developing concepts related to the study.

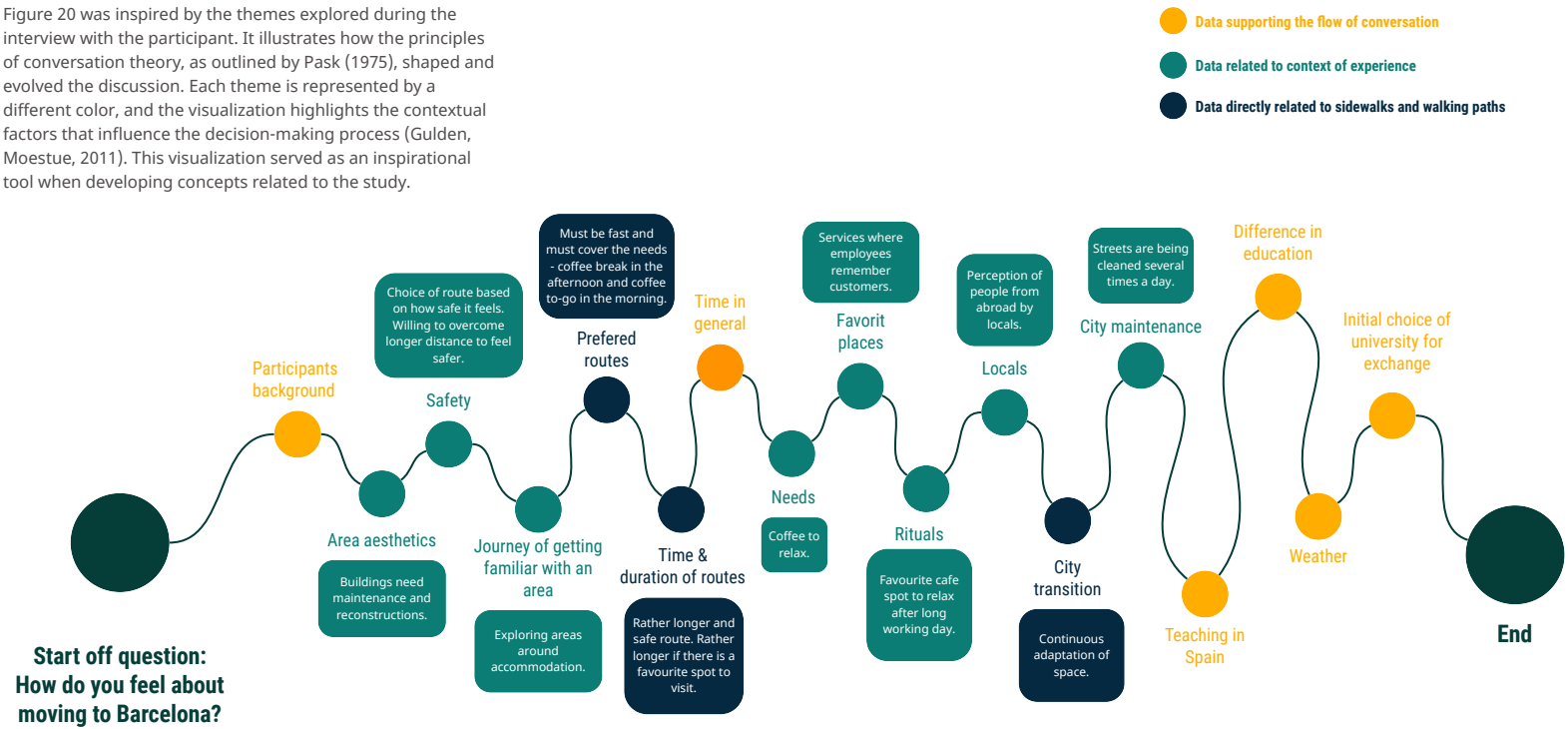


Figure 20 - Visualization inspired by the interview with an exchange student in Barcelona

4.2 Meso

Transport in Oslo

Oslo transportation system comprises both public and private modes of transport. The interplay between these options play a significant role in shaping the city's infrastructure. According to Statistisk Sentralbyrå, there is a noticeable upward trend in the use of public transportation, with numbers gradually approaching pre-COVID levels (Statistisk Sentralbyrå, 2023). This trend is expected to continue in the coming years, resulting in increased pedestrian flow and traffic around transportation hubs and connections. To gain a deeper understanding of long-term transportation trends and tendencies in Oslo, information and data published in pre-covid times proved to be more relevant (Bymiljøetaten, 2020). This is primarily due to the impact of the COVID-19 pandemic, which led to a decline in public transportation usage in 2021.

Figure 21 - Tram in Oslo

Official sources

The access to official information regarding walking was obtained relatively late in the project. As a result, the drivers for the solution space were derived from the survey conducted specifically for this project. However, the purpose of gathering information from official sources was to validate the authenticity of the conclusions drawn from the project's survey.

A comparison between the travel habit surveys conducted in 2014 and 2018 reveals that although people walked less in 2018, there was an increase in the number of individuals who engaged in walking (Figure 22). Walking accounted for approximately one third of all journeys. In February 2019, Ipsos conducted an attitude survey on walking (Bymiljøetaten, 2020). The survey revealed that car owners tend to walk less compared to those who do not own cars, while individuals with bicycles and monthly pass tickets tend to walk more. This suggests that the motivation to walk is influenced by the convenience of using public transportation. Context, destination, and distance were identified as key factors influencing the decision to walk or not. The survey participants indicated that they often choose to walk when running errands, such as going to the shop, library, or doctor. Additionally, survey respondents reported walking more frequently for shorter distances, with 77% of individuals opting to walk for distances under 5 minutes compared to 56% for distances exceeding 15 minutes. The visual representation of the survey's findings regarding walking in Oslo can be observed in Figure 23, provided on the subsequent page.

Figure 22 - Year 2014 and 2018 compared by how many people use types of transportation, and what age groups use the type of transportation (Bymiljøetaten, 2020)

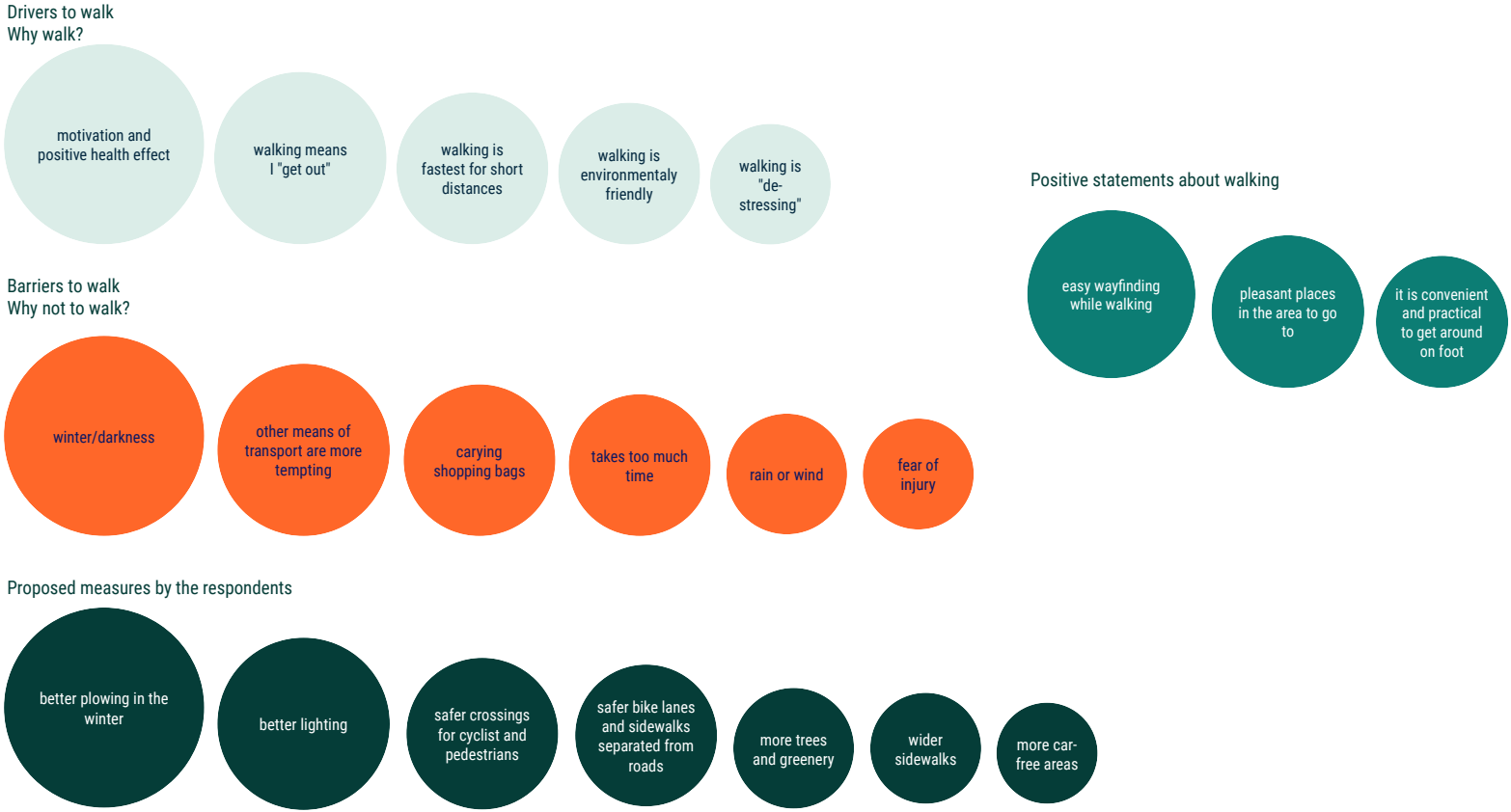


Figure 23 - Visualizations of barriers and drivers (Bymiljøetaten, 2020)

Organisation

The responsibility for different areas within the city is divided among multiple agencies, as depicted in Figure 24. The diagram is based on information presented in the Street Design Manual for Oslo (Bymiljøetaten, 2020). The manual serves as a guide for spatial requirements, planning considerations, and technical specifications for street development in Oslo. The diagram provides a foundation of actors for further systemic analysis.

Figure 24 - Responsibilities for sidewalks within municipality in Oslo

Design manual

To develop a fresh approach to sidewalk design, it was necessary to study existing guiding documents. Typically, street standards are reviewed and updated every ten to fifteen years. However, considering the rapid changes in society, technology, materials, and urban environments, this time frame may be relatively long. Therefore, previously mentioned Street Design Manual was revised in 2020 (Bymiljøetaten, 2020). This manual aligns with the Norwegian Roads Act, the regulations on construction of public roads, and the Planning and Building Act. It serves as a reference and guide for the construction and design of streets. Changes in the manual over time are presented in Figure 25. The key areas of focus in the manual include city life, road-user groups, multi-level infrastructure, vegetation, and the application of universal design principles. In discussions with the Agency for Urban Environment, it was noted that existing sidewalk manuals primarily consider physical parameters (Personal communication, April 2023).

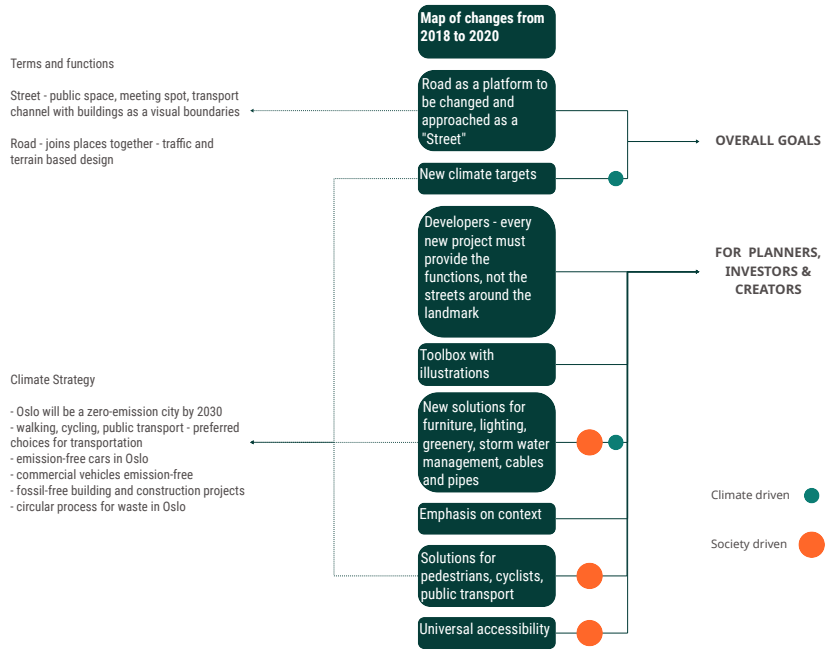


Figure 25 - Visualized findings from the design manual (Bymiljøetaten, 2020)

Sidewalk

Sidewalks are pathways for pedestrian movement. Based on the research, it can be inferred that sidewalks have several primary functions (Gehl, 2011). They are designed to facilitate walking, enable pedestrian access to the city, provide space for people, and connect different areas. Existing street guides have highlighted that the surrounding context of sidewalks is often overlooked, as well as their operational behavior and future implications (Methorst, 2021). Figure 26 illustrates two types of context and their respective subdivisions. Below this text, a set of terms that title sidewalks, or that are related to it are listed in Norwegian.

fortau

gaende

vei

gangbane

fotgjenger

gangvei

gangfelt

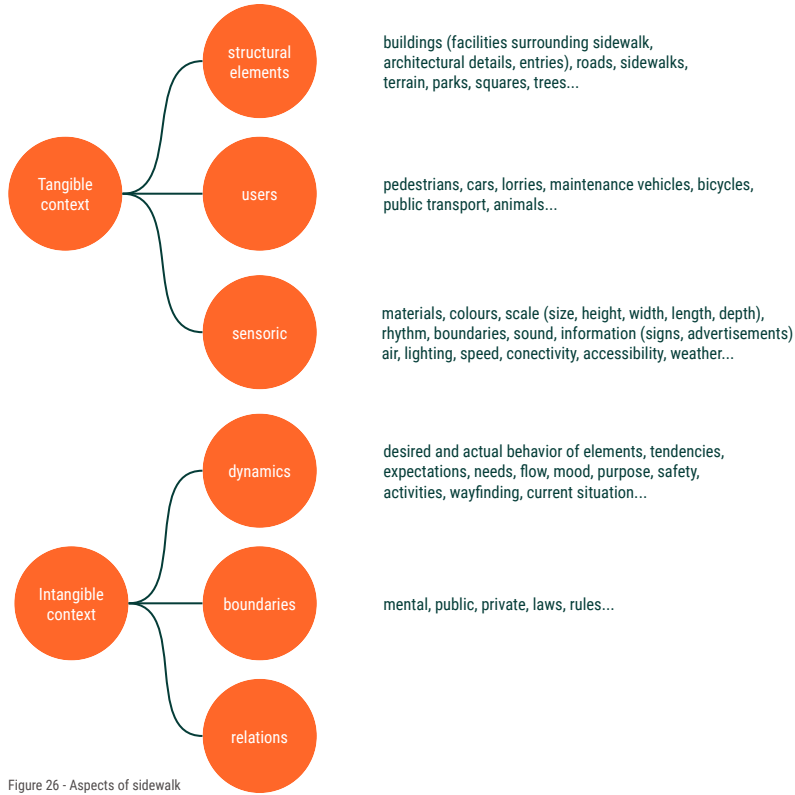


Figure 26 - Aspects of sidewalk

Sidewalk as a set of happenings

Types of activities on sidewalk were visualized in Figure 27 (Gehl, 2011). The aim was to understand walking patterns and behaviors. Gehl views walking as a mode of transportation, a means of moving around, and a way of engaging with the urban environment. There are several important considerations when designing sidewalks. People are generally aware that walking can be tiring, so they prefer direct routes. In busy streets, shorter routes are often preferred over safer ones. Lastly, it is worth noting that pedestrians do not prefer right angles, which is valuable information for urban planners.

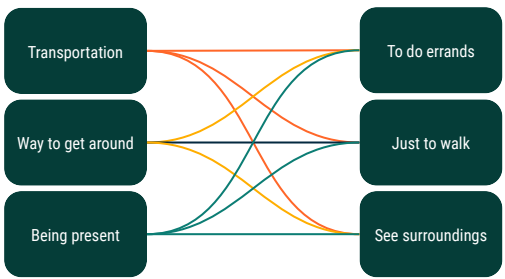


Figure 27 - Combinations of actions at the sidewalk

Experience

The conceptual framework model (Methorst, 2021), depicted in Figure 28, provides insights into the pedestrian experience. The model categorizes different types of behaviors. Lifestyle behavior reflects our individual essence, driven by our needs, goals, and skills in life. Strategic behavior involves making decisions based on our immediate needs and requires access to suitable options for movement. Traveling behavior pertains to pre-planned routes, while operational behavior occurs during the actual travel process.

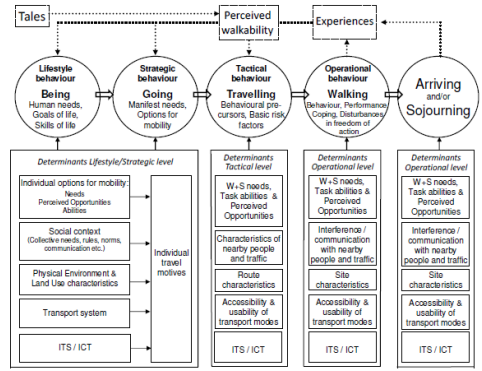


Figure 28 - Conceptual framework for pedestrian behavior (Methorst, 2021)

Rules

Trip to Barcelona initiated the need to map traffic rules, as in pedestrian-friendly areas, there were very few of them. This created a sense of freedom and openness, encouraging relationships and interactions among various modes of transportation. "Forskrift om kjørende og gående trafikk (trafikkregler)," a document introduced in 1986 in Norway, outlines regulations pertaining to both drivers and pedestrians and emphasizes the concept of universal design as a framework for establishing rules between different modes of transportation (Samferdselsdepartementet, 2022). The document's rules concerning pedestrians were translated and compiled in a visual format (Figure 29). Additionally, the underlying principles that likely guided the formulation of these rules are described. On the left side of the visual, the users to whom the rules apply are presented. In the middle section, the specific rules themselves are listed, with colored dots indicating the user groups benefiting from each rule. On the right side, the estimate of principles that were behind the formation of these rules are explained. This is an example of how official documents can be revised to assess the suitability of their principles.

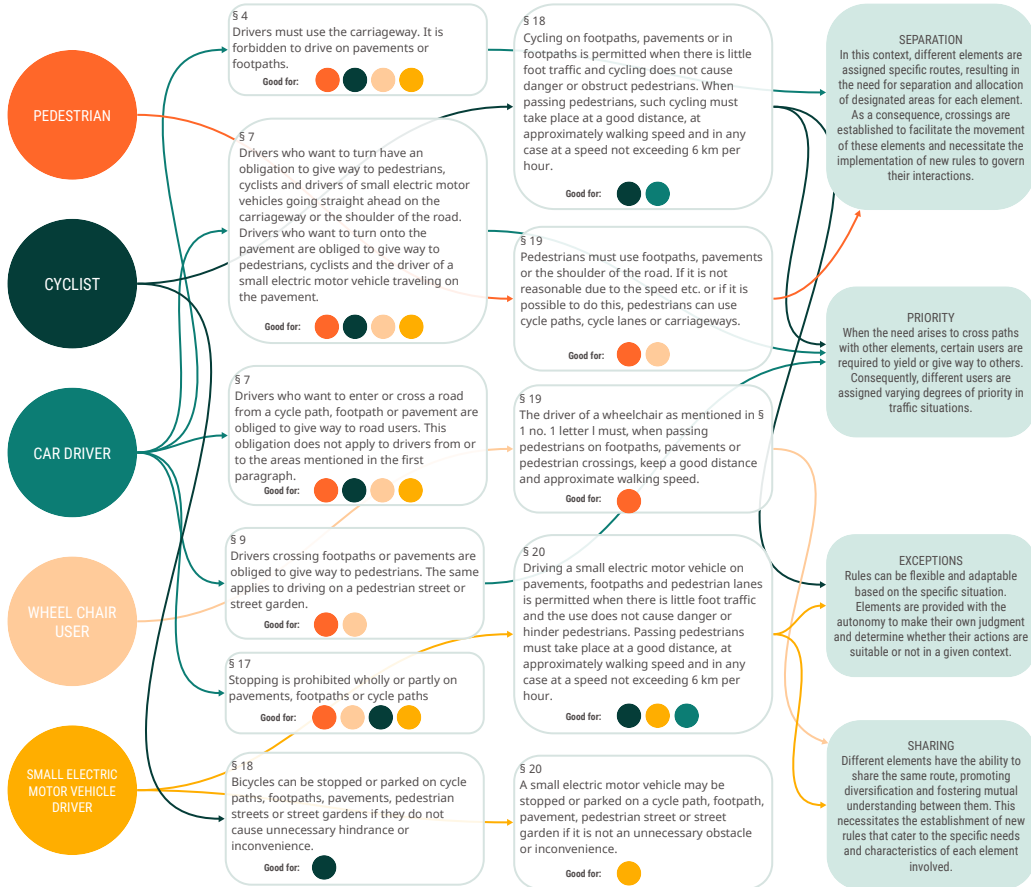


Figure 29 - Visualization of rules that affect pedestrians - from translated original (Samferdselsdepartementet, 2022)

4.3 Micro

First impressions

This research phase aims to explore pedestrians. An aspect to highlight is the diverse range of reactions from friends and individuals who have engaged in discussions about this project. These reactions varied based on their backgrounds and understanding of the subject, yet they converged on one central point. It is worth noting that people often expressed surprise at the focus on the "sidewalk" as the main theme, considering it an unconventional and seemingly unremarkable choice within the realm of design. This observation sheds light on our perception of sidewalks and their perceived lack of interest in creative endeavors.

Users

Figure 30 presents a list of users and elements that can be found on sidewalks in two groups:

a. Operative: living beings with diverse needs and forms, such as pedestrians, cyclists, skateboarders, strollers, and other active participants

b. Inoperative: elements unintentionally or intentionally placed on sidewalks. In the survey conducted for this project, participants referred to them as surprises, obstacles, or sources of discomfort during their walking experiences.

By identifying and categorizing these users and elements, a clearer understanding can be gained of dynamics that influence pedestrian interactions on sidewalks.

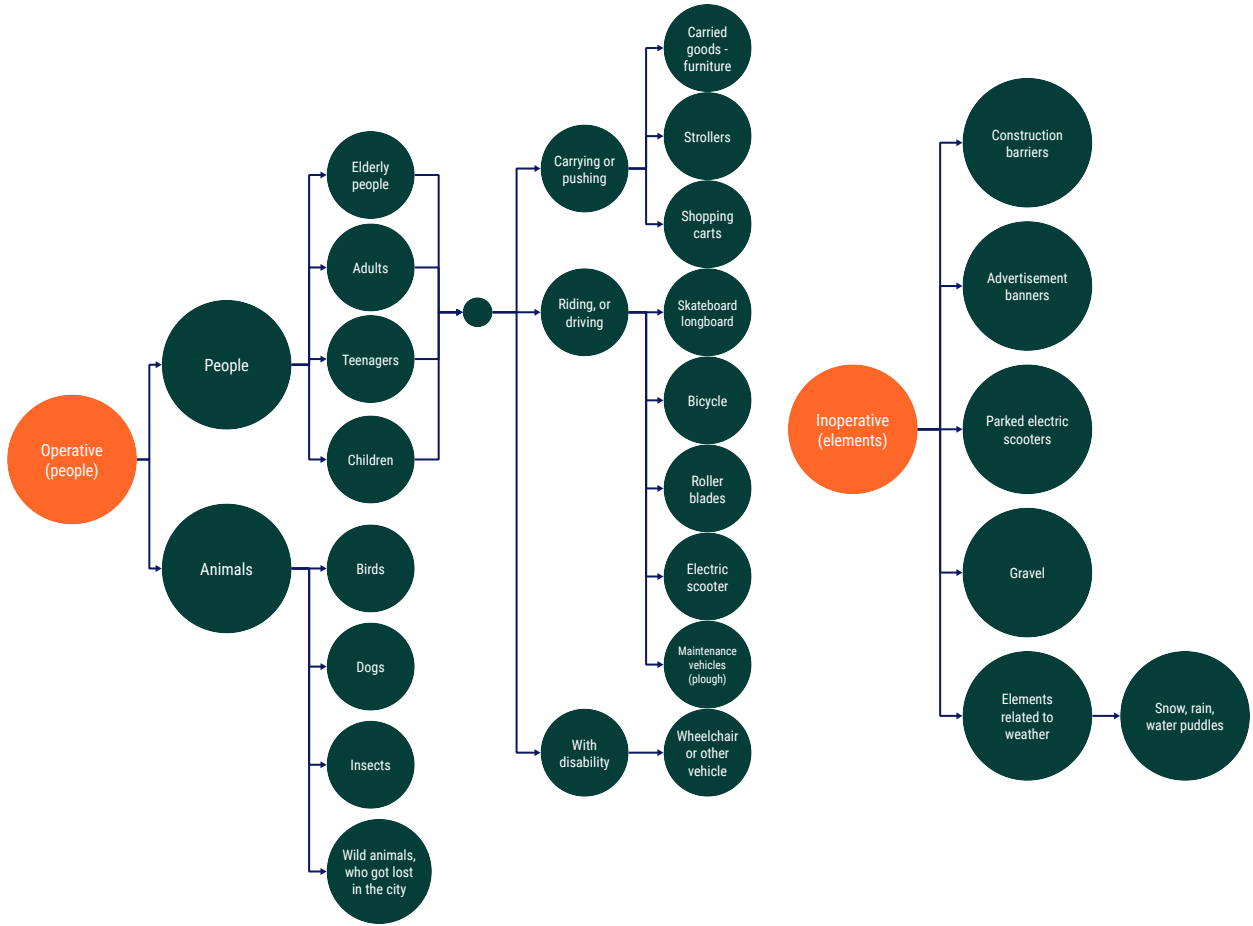


Figure 30 - Division of elements that are present on sidewalks

Survey

A 7-minute survey was crafted to gather data from individuals across diverse life situations, age groups, and backgrounds, ensuring the relevance and applicability of the proposed product/solution within the Oslo context. The survey aimed to uncover indicators of quality in public spaces. Through an iterative process, three different versions of the survey were developed (versions can be found in the appendix). It involved refining the questions to capture the relationships between opinions and experiences. Alongside this, a preliminary visualization of the sidewalk systems on gigamap helped to gather and oganize this knowledge.

To ensure a broad reach, a plan was devised for engaging participants through multiple phases:

1. Utilizing personal contacts of students
2. Tapping into the networks of students' acquaintances
3. Publicly sharing the survey on university social media platforms
4. Placing physical copies of the survey in public locations
5. Personally distributing surveys to individuals on the street

Reaching out to personal contacts proved to be the most effective method in terms of response rate. These participants were encouraged to share the survey with their relatives and acquaintances. To collect more responses, additional measures were required. The survey link was printed as a QR code on leaflets accompanied by handwritten descriptions in Norwegian. These leaflets were strategically placed on the walls of tram stops in three busy areas of Oslo, namely Holbergs Plass, Stortorvet, and Olafs Ryess Plass (see Figure 31). However, this method generated only a few responses. Another approach involved personally engaging with people on the streets, where small pieces of paper with printed QR codes were handed out. Unfortunately, the overall interest in participating was relatively low. Interestingly, the success of attracting participants was influenced by how the project was described. Merely mentioning that it was a student project focusing on walking proved to be ineffective. However, when the project's goals were explained, participants' attitudes towards filling out the survey changed positively. Additionally, visibly identifying the person distributing the QR codes proved to be effective when approaching individuals.

Figure 31 - Survey QR code posted on the tram stop

Responses

A total of forty-six responses were collected in the survey. The participants were initially asked about their age and location. The majority of respondents (around 90%) fell within the 18 to 25 years age range, and almost all of them (approximately 90%) resided in Oslo. This demographic information was crucial as it ensured that the data collected would be relevant to the context of Oslo.

When it came to daily commuting, the survey revealed that the majority of participants (85%) relied on public transportation, while walking was the second most common mode of transportation (50%), and cycling represented a significantly lower percentage (13%). However, when asked about their preferred mode of transportation, walking emerged as the top choice (63%), followed by cycling (37%), with public transport ranking third (24%). Only a small percentage of participants (4%) expressed a desire to drive a car.

In terms of walking speed, 61% of respondents considered themselves to be in a rush, while the remaining participants preferred to take a slower pace. Although self-assessing one's walking speed can be subjective, the goal was to provide options that participants could identify with.

Regarding the frequency of changing their route to work or school, 52% of respondents reported rarely changing their path, 30% indicated they sometimes made changes, while only 9% stated they often did, and 4% claimed they always chose different options. Notably, only a small percentage (4%) stated that they never changed their route, indicating that the majority (96%) had a tendency to explore and experience different preferences within the public space. Opting for the same route could be attributed to habit or a preference for the fastest and safest route.

Overall, these findings shed light on the transportation habits and preferences of the survey participants, emphasizing the significance of walking as a preferred mode of transport and the potential for individuals to explore alternative paths within the urban environment.

The context was split into four categories:

a. Drivers - things that engage action and joy

b. Barriers - things that are considered obstacles in producing engagement

c. Other - elements that are part of the context in various forms.

Drivers

Factors influencing action or decision-making were collected through a set of questions. The percentages presented indicate the proportion of participants who selected a particular option (participants were allowed to choose multiple options). In terms of walking during leisure time, 70% of respondents indicated that natural elements were the main reason for their choice of route.

Three other factors were selected by approximately 40% of respondents: personal preference for a favorite path, the length of the walk (in terms of distance), and the location of the route (proximity to the participant's accommodation). Additionally, other factors were identified, including seeking silence, less crowded areas, surface quality, and online recommendations.

Regarding the perceived benefits of walking, the majority of participants (74%, as shown in Figure 32) stated that walking provided them with time to be alone and made them feel generally better. Half of the participants believed that walking gave them the freedom to make decisions, while approximately 37% found the opportunity to run various errands beneficial.

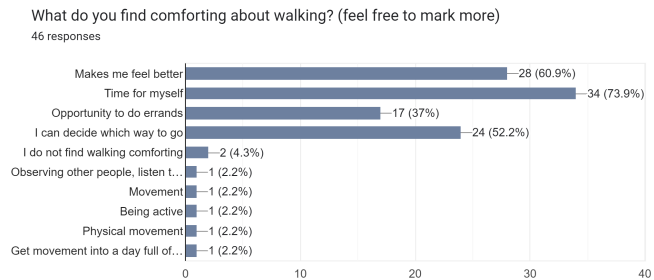


Figure 32 - What people find comforting about walking.

Another approach to understanding preferences was to inquire about activities related to walking. Participants were given the option to select multiple activities. For example, 76% of participants indicated that they tend to listen to music while walking, and 52% mentioned listening to podcasts. The intention was to use varied terminology, including words like "imagine" or "thinking." Interestingly, around 44% of participants, nearly half of the respondents, chose the option of imagining things, and 65% stated that they think about different things while walking. This suggests that the choice of terminology can influence how people express themselves. This analysis raised questions about the appropriateness of the questions asked, whether the right aspects were being explored, and if the questions were framed effectively. Inspired by Street Design Manual for Oslo, a question that gather participants' preferences regarding street typologies and potentially identifies streets with qualities worth revisiting (Bymiljøetaten, 2020). Three example streets were provided:

- Karl Johans gate, representing an A1 street exclusively for pedestrians.
- Torggata, an A2 street designated for shared use by pedestrians and motor vehicles with low speed levels.
- Thorvald Meyers gate, an A3 street prioritizing public transport passability.

The responses shown in Figure 33 indicate that 41% of participants would enjoy revisiting Thorvald Meyers gate (representing an A3 street), while 22% would return to Karl Johans gate (A1) and a similar proportion of 17% would revisit Torggata (A2). Participants also suggested additional streets in close proximity to parks. This comparison between theoretical typologies and participants' actual preferences provides insights into the alignment or divergence between goals and the perception of the environment.

Barriers

One of the objectives was to map barriers, which can serve as areas for improvement. Firstly, participants were asked to identify irritations they encounter on their way to work or school. Weather conditions and public transport delays were identified as major problems by 57% of participants. The third most common barriers were road crossings, poor public transport connections, vehicles, and traffic, with 28% to 39% of participants mentioning them. While weather conditions cannot be controlled, they are still considered a factor that can be addressed. Some pedestrians also identified fellow pedestrians as obstacles, particularly when they stand still on busy sidewalks.

When specifically discussing sidewalks, 62% of participants marked "people standing in the way" as the most annoying aspect, followed by electric scooters parked on sidewalks (55%), and finally, water puddles and snow (50-52%). Interestingly, participants also expressed annoyance with narrow paths. Furthermore, when asked about reporting defects found on sidewalks, 83% of participants stated that they would not report such defects, while only 4% indicated that they would. Additional options provided by participants indicated a lack of awareness about how to report defects and to whom they should be reported.

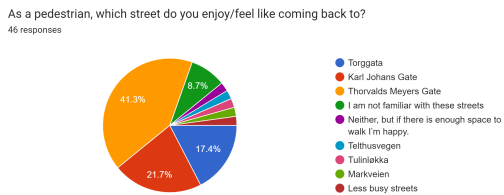


Figure 33 - Validation of street types and opinions of pedestrians

Other elements

Safety is an important aspect that influences both the choice of paths and acts as a potential barrier. For instance, during an interview with an exchange student in Barcelona, the participant expressed a preference for a longer but safer route over a faster one. This highlights how safety can drive the selection of a particular route. In the survey, questions were designed to identify elements that evoke fear and gather opinions about safety in Oslo. The results indicate that 94% of participants feel safe while navigating Oslo. Figure 34 illustrates the distribution of fear-inducing elements and their impact on pedestrians. Additionally, participants were asked about their willingness to share the sidewalk with different user groups. The majority expressed a willingness to share with roller bladers and skateboarders (48-52%), followed by cyclists (26%), and electric scooter riders (17%). It is intriguing to observe how trust in other users increases as their speed decreases.

On the following page, a list of messages is provided, which represents the statements participants would like to convey to drivers. The size of each statement corresponds to the frequency of its mention by participants.

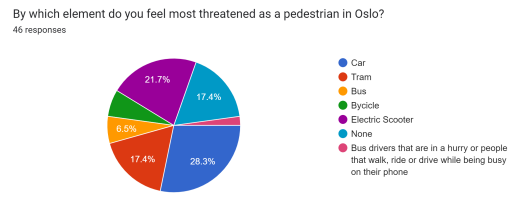


Figure 34 - Fear from transportation

Survey findings

Figure 35 presents a comparison between the main drivers for walking and the barriers encountered. A brief analysis was conducted to explore the relationships between them, leading to several interesting observations. Despite being a cause of barriers, nature remains the most significant motivation for walking. This suggests that the value provided by nature outweighs the challenges it presents. Road crossings, on the other hand, are both obstacles and sources of transportation delays on busy streets, leading to a decrease in the overall feeling of well-being as they require extra effort to navigate. Furthermore, road crossings limit pedestrians' intuition and freedom of choice. These findings were then transformed into questions, as depicted in the visualization below (Figure 36), which were instrumental in developing an intervention strategy within the realm of solutions. The subsequent page showcases the messages from the survey that pedestrians expressed a desire to convey to car drivers.

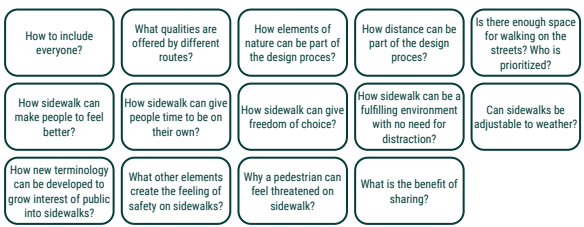


Figure 36 - Questions derived from survey

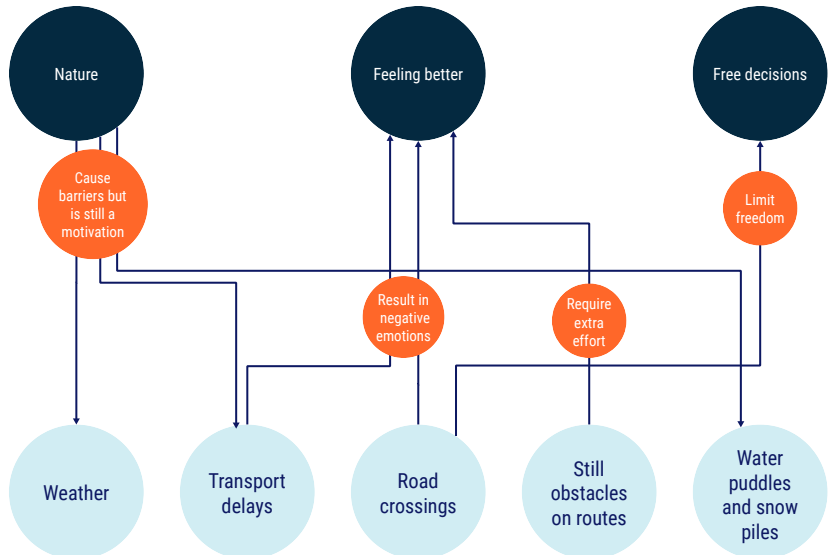


Figure 35 - Drivers versus barriers

Drive only if you need to.

Make it obvious for pedestrians that they've registered that they are crossing the road by slowing down.

There should be no cars or taxis in city centre. No parking at sidewalks.

Nothing but better infrastructure and be more considerate of others.

Don't speed up when you are driving towards someone crossing the road.

Slow down!

Only electric cars.

Just make them sure to signal better that their braking before im crossing a road. Sometimes its hard to trust that the drivers are braking, and I dont want to cross until im 100% that the car is slowing down and that the driver can see me.

No parking on cycling lanes.

Less cars.

Give way to pedestrians and cyclists at all times.

I am not sure what to say.

Drive slow when approaching crossings.

Not using the phone behind the wheel or having the phone within reach of the driver to avoid all distractions.

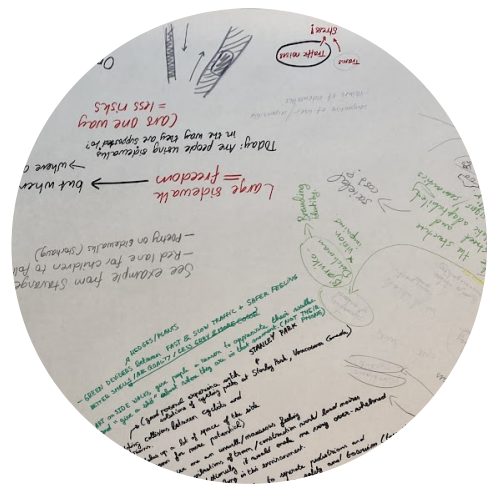
6 Thinking Hats

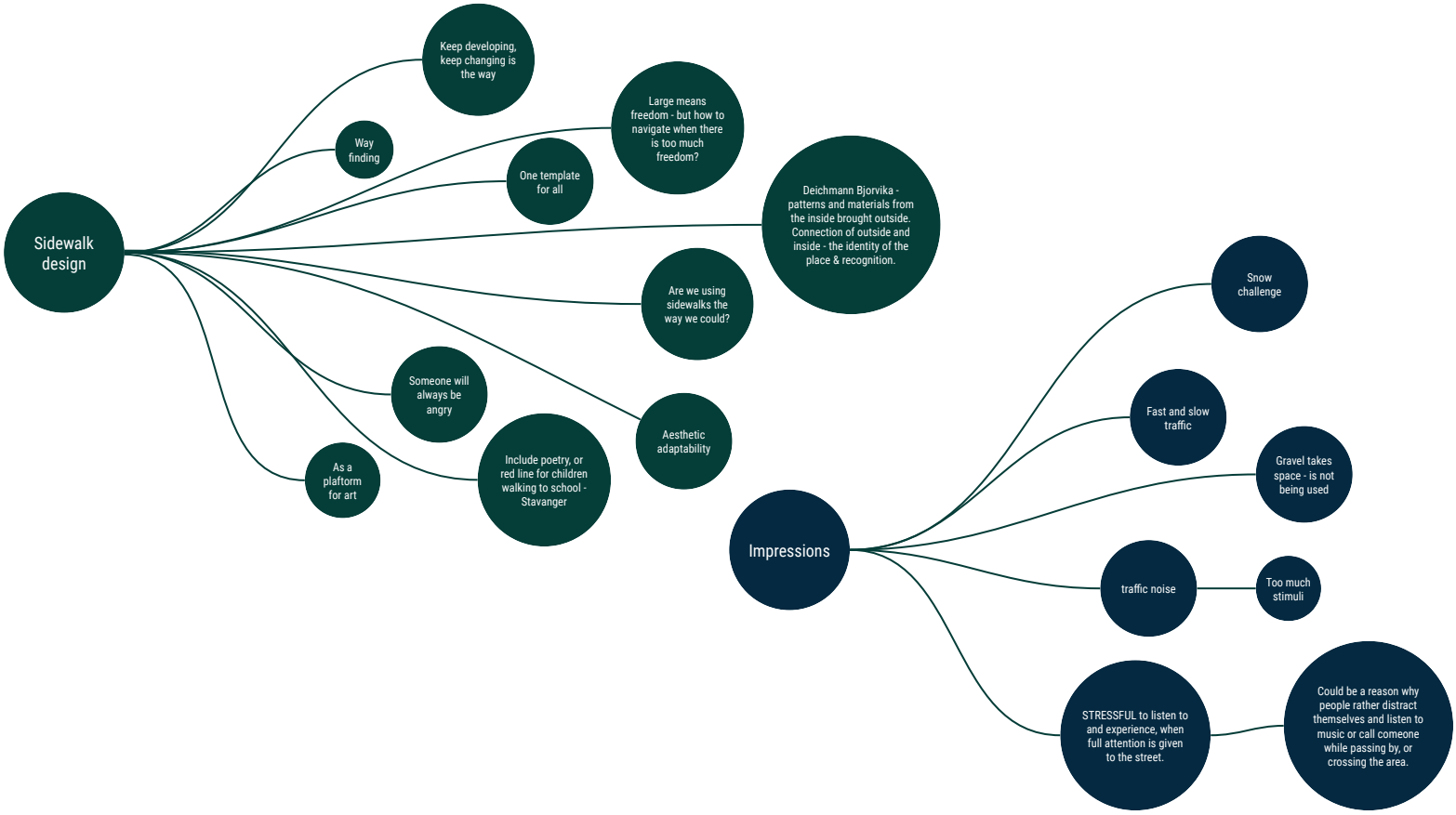
An alternative method of data collection involved utilizing student group sessions during the Product Design course. These were designed to facilitate peer-to-peer feedback on the participants' work (Personal communication, 2023). One specific session employed the "6 Thinking Hats" (Bono in 1999). This strategy uses six distinct approaches to feedback, each represented by a different colored hat.

Prior to the session, a plan was devised on how to utilize the reflections obtained. As the survey was nearing completion, the session was used to plan and generate ideas for the subsequent steps of the project.

The reflection team consisted of four students and the teacher, each working on separate master projects. This diversity allowed participants to detach from their own perspectives and engage in fruitful ideation. During the session, one student would briefly introduce a challenge for the group to discuss. The thoughts and ideas generated during the discussion were recorded on paper using color markers corresponding to the respective "thinking hat." The end result was a large white canvas adorned with notes from the session's discussion (picture at the bottom of this page).

The team was shown a photograph (on the top) of a sidewalk at Carl Berners Plass that is on this page accompanied by a one-minute recording of sounds from the street captured in the photo. This provided participants with a better understanding of the environment. A goal was to challenge participants to ideate on the elements they perceived in such an environment. Page 49 gathers main findings, and page 50 concludes the meeting in a statement.

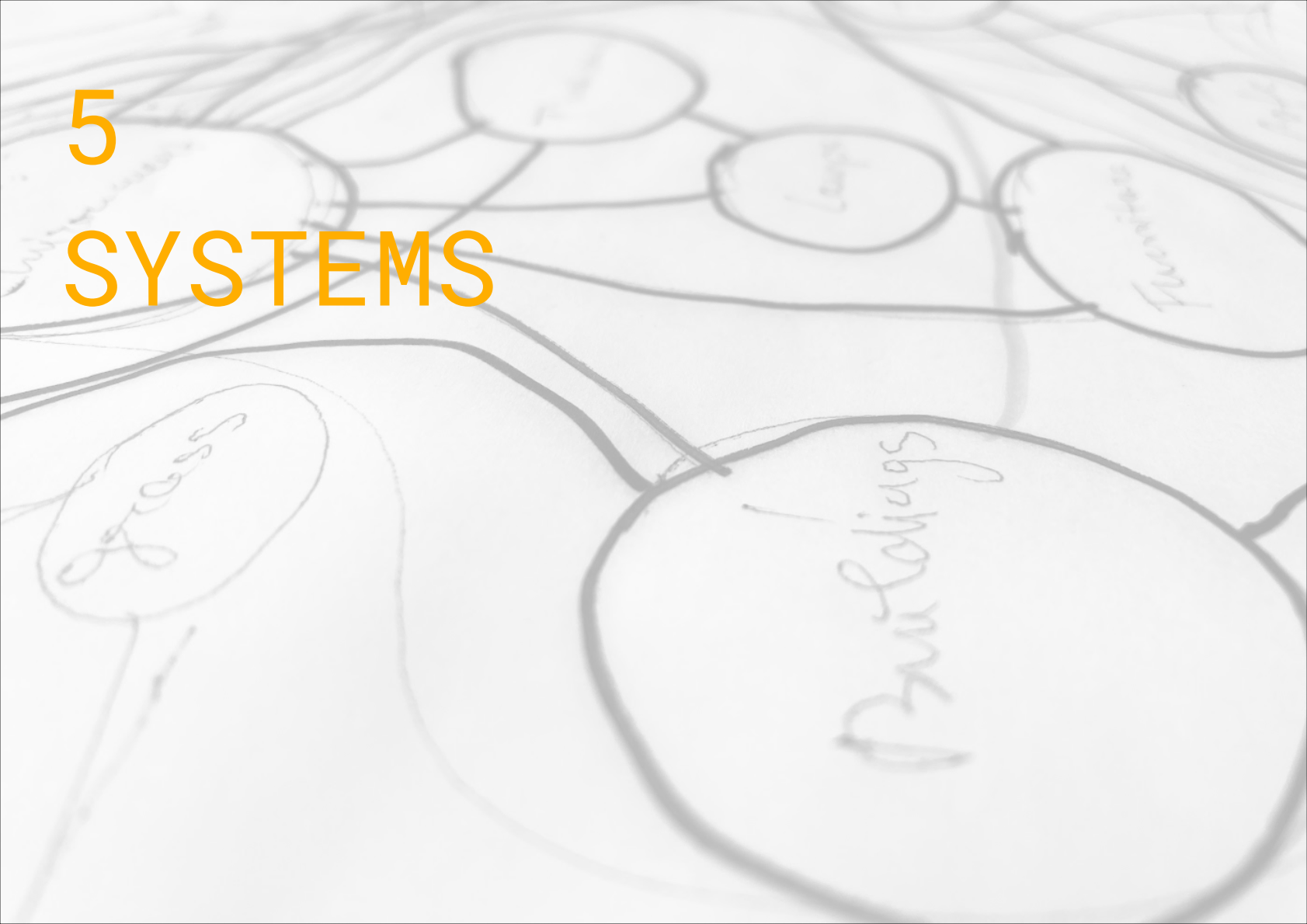



Sidewalk design
Keep developing, keep changing is the way
Way finding
Large means freedom - but how to navigate when there is too much freedom?
One template for all
Deichmann Bjorvika - patterns and materials from the inside brought outside. Connection of outside and inside - the identity of the place & recognition.
Are we using sidewalks the way we could?
Someone will always be angry
Aesthetic adaptability
As a plaftorm for art
Include poetry, or red line for children walking to school - Stavanger
Impressions
Snow challenge
Fast and slow traffic
Gravel takes space - is not being used
traffic noise
Too much stimuli
STRESSFUL to listen to and experience, when full attention is given to the street.
Could be a reason why people rather distract themselves and listen to music or call comeone while passing by, or crossing the area.

… people are distracting themselves from the moment. They listen to music, or call someone, because there is nothing interesting out there… The city should give them a reason to be present in space …

(Note written during the discussion, 2023)

5 SYSTEMS



Designing complexity

Explaining the role of a systemic designer in urban development projects can be a challenging task. Unlike product designers who focus primarily on understanding users, functions, and the specific application of a product, systems-oriented designers must delve deeper and grasp the complexities at broader levels. Maier and Fadel conducted a study on the complexity of design, emphasizing the significance of considering additional insights and interactions within the designer-artifact-user (DAU) system (Maier & Fadel, 2007).

Figure 37 presents a model that illustrates how designers make sense of systemic design by looking beyond the immediate context. This model highlights the importance of considering various factors surrounding the situation of interest. In this specific project, a customized model (Figure 38) was developed to demonstrate how the designer's thoughts must transcend different aspects of the system in this project. This is to understand purpose of the designer when working with complexity.

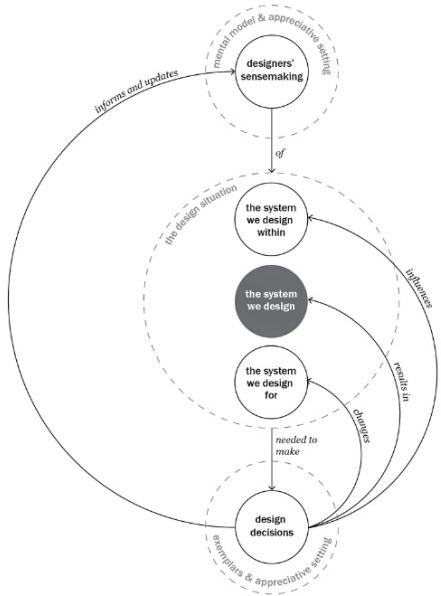


Figure 37 - The systemic sensemaking model (Lurås, 2016)

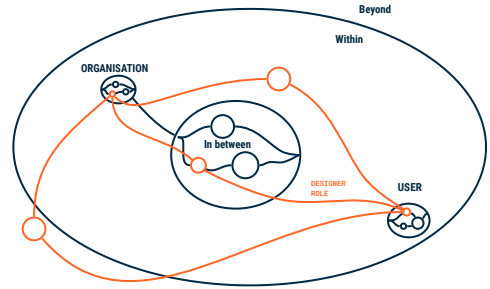


Figure 38 - The scope of designers action

5.1 Framing the system

Framework

In order to maintain coherence throughout the process, the framework followed a path inspired by the seven stages to destination from the systemic design toolkit (Jones & Ael, 2022). This process was customized to align with the specific needs and context of the project. While adapting the original framework, the stages of framing the system were retained, and listening and understanding systems were combined into a single step. The last four sections, including envisioning desired futures, exploring the possibility space, planning the change process, and fostering transition, were merged into the solution space phase for the purpose of this report (Figure 39).

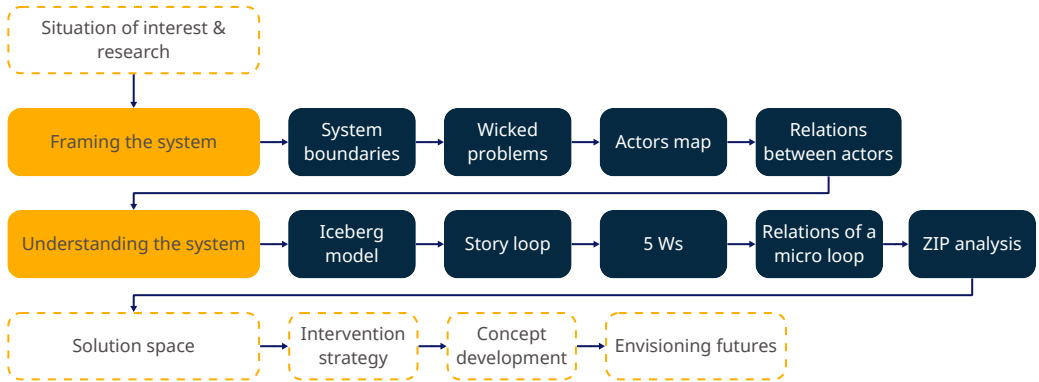


Figure 39 - Custom made framework for systemic study

Boundaries

Identifying boundaries within a systemic design project, particularly in the context of a city, presents a significant challenge. The objective was to determine the scope of the study within the project timeframe.

First limitation arises from the extent of knowledge available from various disciplines that could contribute to the project.

Another limitation stems from the time constraints of data gathering. Conducting more complex research would require different formats, timeframes, and additional resources. In this project, time impacts both the project's span and the possibilities for interventions that can be pursued by the city using its own resources.

The potential for collaboration within the network was subject to certain limitations at the time. The information available relied on data accessible online and discussions with the organization in the later stages of the project. Figure 40 provides an overview of the limitations associated with this project.

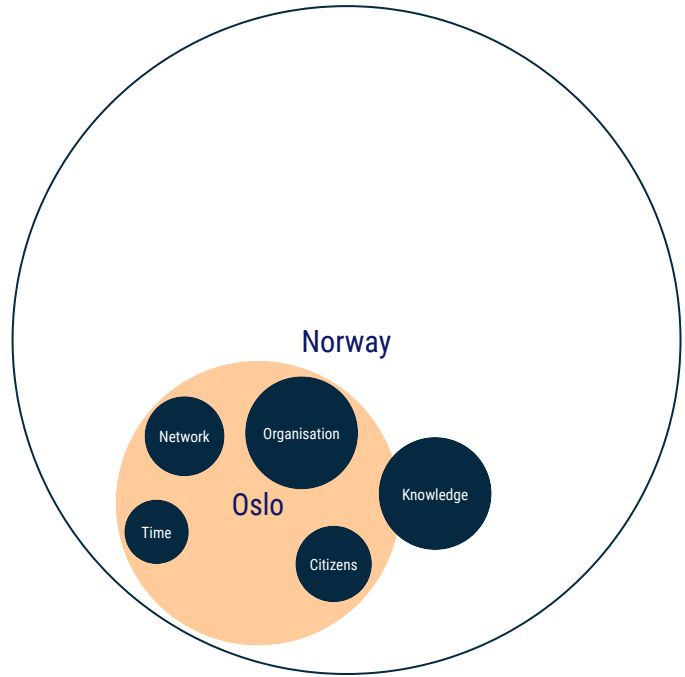


Figure 40 - Project boundaries

Wicked problems

Addressing complex problems necessitates reaching agreement on solutions. Sweeting explores the concept of adaptability as a strategic approach in architecture, illustrating this principle through a design proposal (Sweeting, 2019). The design's focal point is providing users with the flexibility to reorganize the space according to their needs, allowing for ongoing adaptation even as years pass.

This process begins with the identification of "wicked problems." These problems are complex in nature, involving multiple parties and often lacking clear roots. The same complexity applies to the solution space. Rittel and Webber assert that an iterative problem-solving approach is the most relevant way to tackle wicked problems (Rittel & Webber, 1973).

The diverse needs of various user groups in urban transportation reveal gaps in understanding and infrastructure adaptation. For example, the historical prioritization of motorized transportation and road-centric urban environments has created imbalances. Accommodating one user group often affects the behavior and experiences of others. Establishing comprehension at both the organizational and user group levels can serve as a foundation for resilient communication and the pursuit of the common good. The surroundings of sidewalks undeniably influence our behavior, as we all utilize and navigate them, often unconsciously. Accepting the existing environment, with its strengths and weaknesses, represents an implicit contribution we all make to the city. This collective acceptance influences the presence of people in public spaces. Achieving consensus among politicians, municipalities, and citizens is crucial. However, bridging the gap between actors operating at different scales and levels poses a significant challenge.

"This century has been a losing battle with the issue of quantity."

(Rem Koolhaas, 1995)

Map of actors

The map of actors was also divided into macro, meso, and micro levels, similarly to research. Figure 41 presents a comprehensive list of stakeholders operating at these different levels, each contributing within the confines of their respective structures. The purpose of this model was to illustrate the level at which these actors function within the organizational systems and identify the institutions and disciplines that have an impact on sidewalks (Sevaldson, 2022).

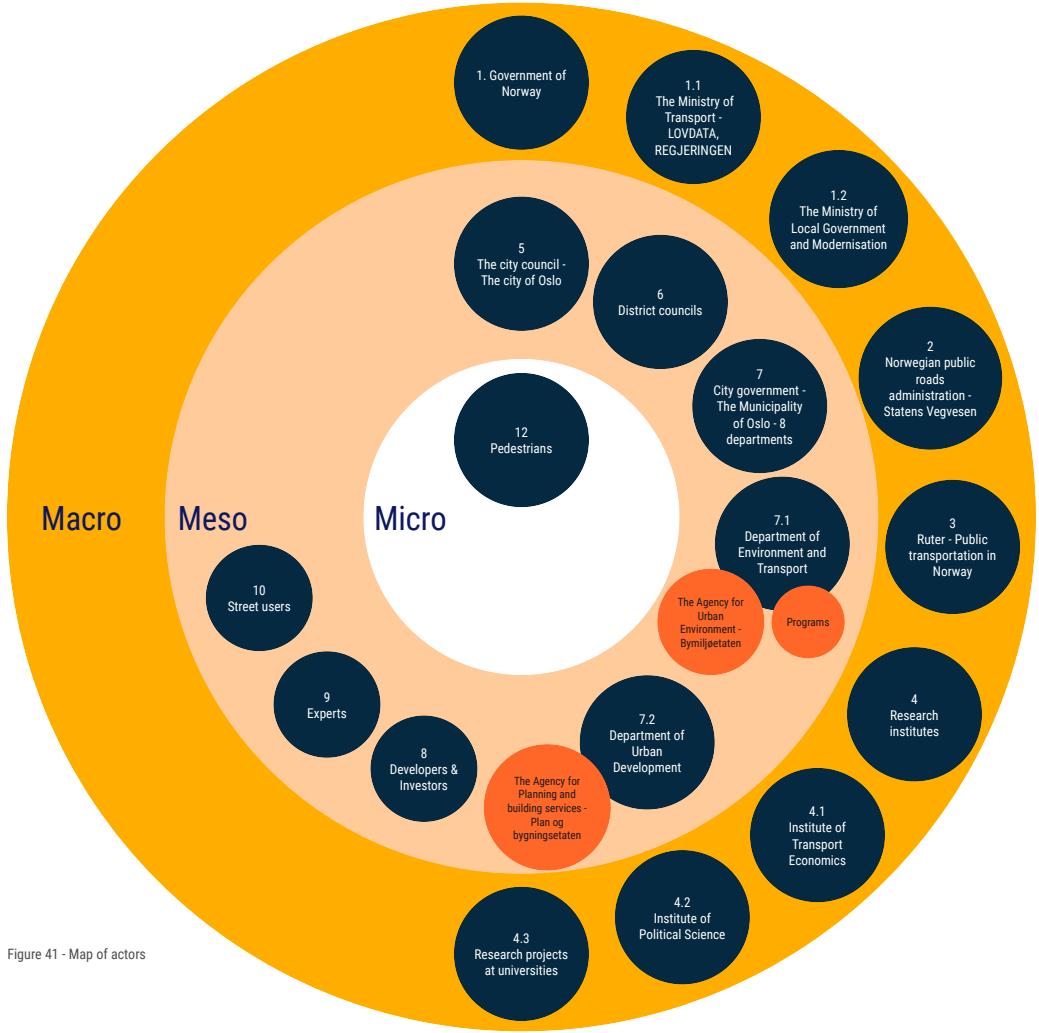


Figure 41 - Map of actors

5.2 Understanding the system

Relations between actors

In order to understand the roles of different actors, a relational map was developed, depicting the feedback and quality delivery relationships among them (Sevaldson, 2022). Map represented in Figure 42, was based on estimates and existing research. Subsequently, the municipality representative was consulted, and the map was revised with actual information (Personal communication, April 2023).

The feedback-based relations on the map demonstrate the interdependency between various actors in terms of communication. For instance, there is a feedback relation between pedestrians (users) and the organization responsible for maintaining sidewalks in winter. User feedback plays a crucial role in determining the frequency of snow plowing. During discussions, it was discovered that immediate feedback from users is collected in the form of complaints. This means that positive feedback, or the positive attributes of sidewalks and public spaces, are not reaching the organization. Surveys conducted provide these missing knowledge to a certain extent. This became an important driver in the solution space. A similar feedback mechanism exists for Ruter, where feedback is predominantly collected through their app, based on user complaints.

Identifying quality delivery relations proved to be more challenging at all system levels. Maps explored and highlighted the ways in which quality is delivered and to whom it is delivered. This encompasses any form of quality, including solutions that require qualitative research or produce outcomes that enhance the quality of the user experience.

During the discussion with the municipality representative, a question was posed regarding which actors lacked quality in any form. The purple area highlighted in Figure 43 indicates the areas where quality is desired. It reveals that the expectations are directed towards actors responsible at the national level, including The Oslo City Council, The Agency for Urban Environment, developers, The Agency for Planning and Building Services, research institutes, and the Vegvesen.

Another topic discussed with the municipality was the identification of a problematic area that poses challenges in project realization and development. The answer provided that clarifying goals and future possibilities within the municipality appeared to be the challenging. Several other points were also raised during the discussion, such as the need for a better formula for designing sidewalks that encompasses quality in terms of comfort and attractiveness.

In summary, this exercise helped in understanding the structure and provided an opportunity to update the relational map with feedback from organisation, which is the target audience in this project. It highlighted the importance of increased communication between the different stakeholders.

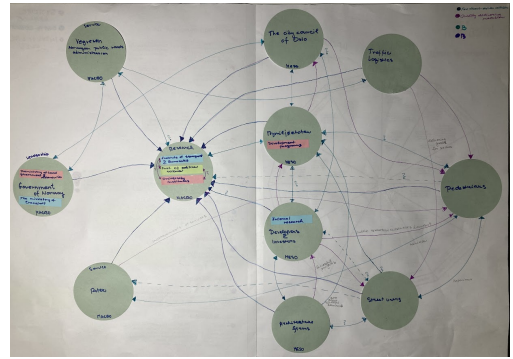


Figure 42 - Relations that were drawn before the meeting

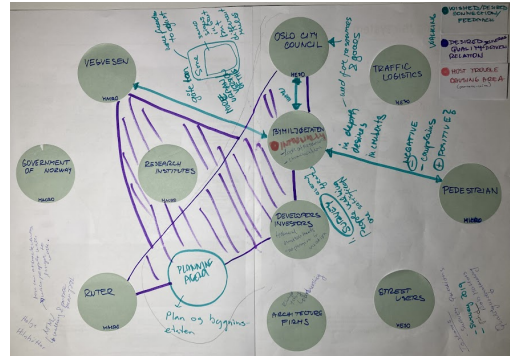


Figure 43 - Relations that were crafted together with Bymiljøetaten

Causes of events

The survey highlighted various events that happen while walking. To gather them, a version of the Iceberg model, tailored to systemic design (Jones & Ael, 2022) was used, as depicted in Figure 44. The result closely resembles the original but encourages the exploration of relations between events and their causes. The model encompasses events, their underlying causes within structures, social trends, and the unconscious beliefs represented by metaphors. The events were sourced from the survey, while the structures and systems represent the immediate actions resulting from these events. The social trends reflect prevailing trends in Norway (The Institute of Transport Economics - Norwegian Centre for Transport Research, 2018), and the myths represent the collective beliefs within society that drive these trends.

Adding relations facilitated connections and dependencies, allowing for a deeper understanding of the causes behind the events. On the right side of the model, a set of questions was generated as part of the process. These questions do not encompass the entire scope of further study in the project but represent fragments of it. The model serves as a valuable tool for comprehending and explaining the broader contexts in which events occur, leading to societal trends and beliefs. Municipalities can benefit from understanding how these interconnected trends shape society and explore how they can be intentionally designed to benefit communities.

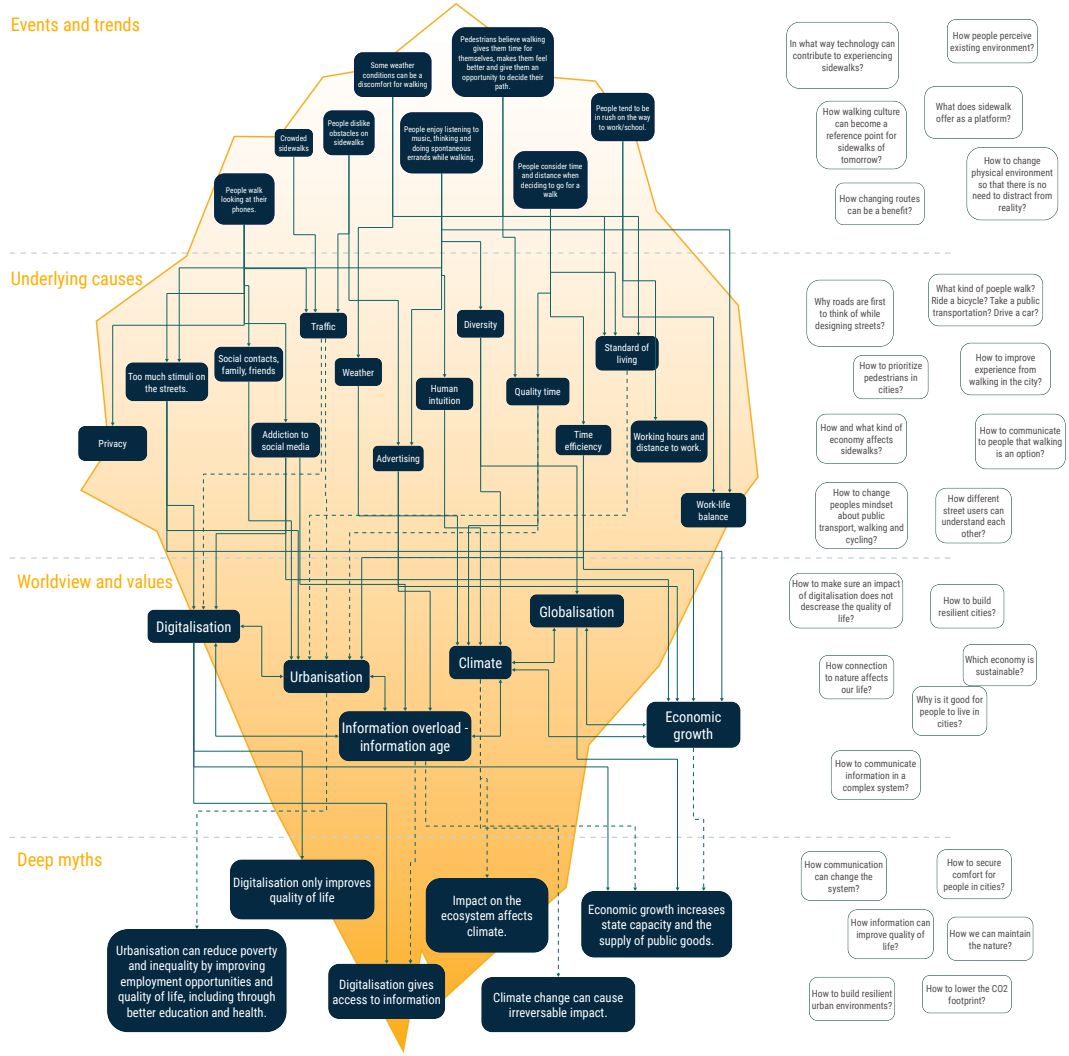


Figure 44 - Causes of events on the Iceberg model

Story loops

The story loop of a microsystem

The diagram on the right side illustrates the microsystem loop that forms the basis of this study. This played a central role in the development of the survey conducted for this project and serves as a focal point for envisioning future changes. The loop represents the daily journey of a citizen, traveling from point A (home) to point B (work or educational institution) and returning back from B to A. This recurring loop of a citizen's transition acts as the context for further system analysis. The loop depicted in Figure 45 draws inspiration from the concept presented by IBM (Cook, 2011). It also incorporates elements from the story loop diagram, which was developed as a tool for understanding systems (Jones, 2022).

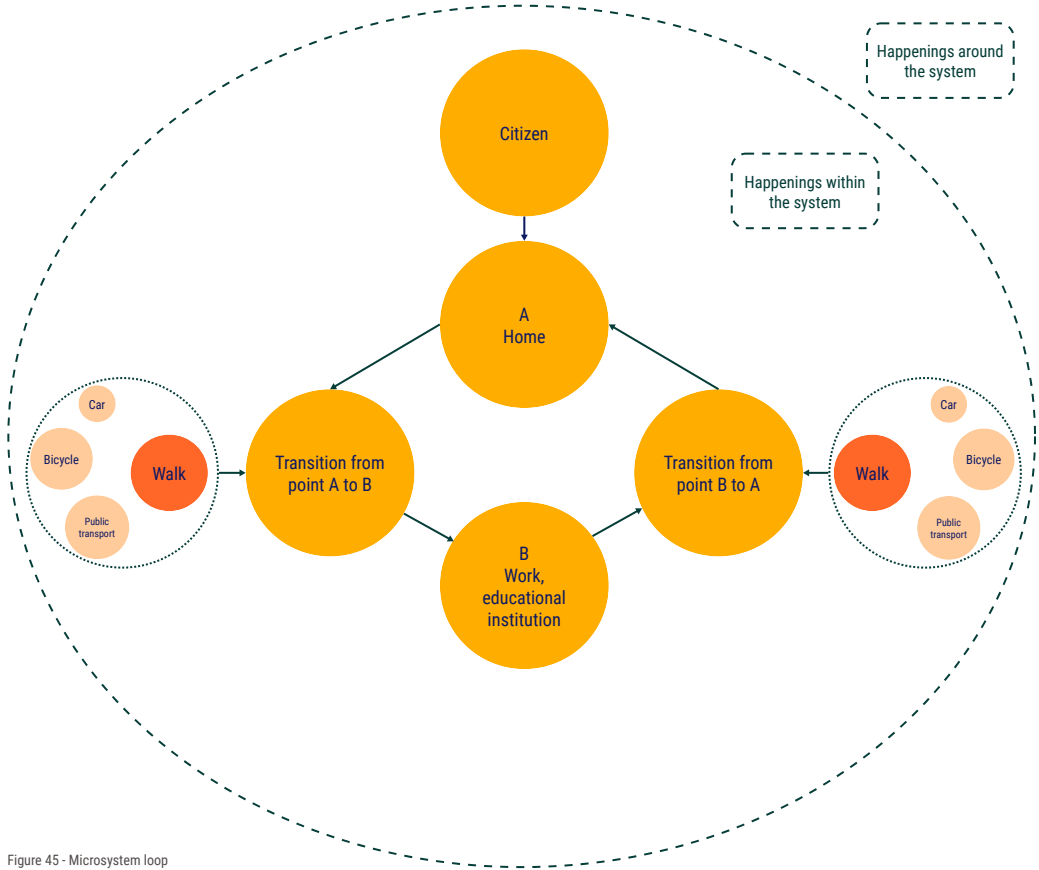


Figure 45 - Microsystem loop

Other surrounding variables

To identify additional variables surrounding the micro loop, the 5Ws method was employed. This method, inspired by the questions "Who, What, Where, When, and Why," was useful to explore these variables (Adobe Experience Cloud Blog, 2018). It served as a valuable starting point before delving into the study of other influences. The micro loop itself is marked in blue colour in Figure 46.

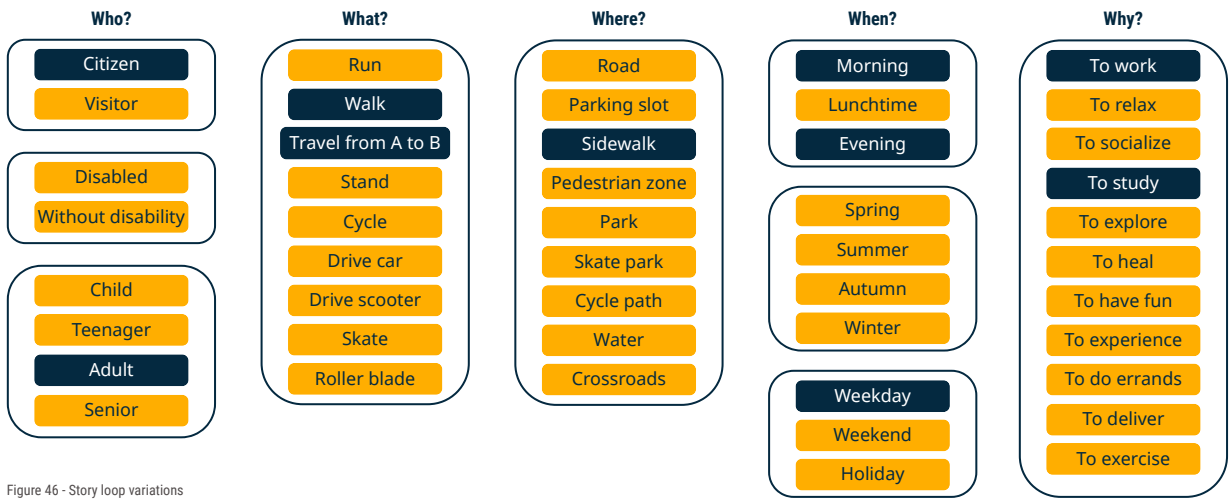
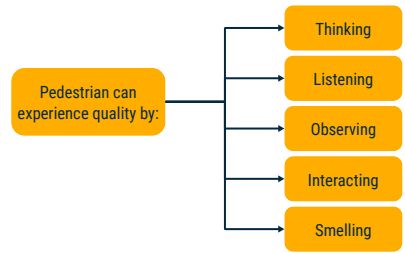


Figure 46 - Story loop variations

Barriers and drivers within the story loops

Drivers and barriers for walking are a direct response of the systems functioning. This objective was pursued through the survey conducted as part of this study. One of the most promising drivers identified was the connection to nature, which encompasses aspects such as providing space for contemplation, imagination, and personal well-being. Consequently, the goal was to incorporate elements that enhance the quality of the pedestrian experience.

Figure 47 presents an exercise that encourages imagination and explores how these qualities can be applied to users' journeys. This exercise served as a preparatory step before the ideation process and the further analysis of the potential future improvements for sidewalks. The drawing was made on a large whiteboard in the classroom.



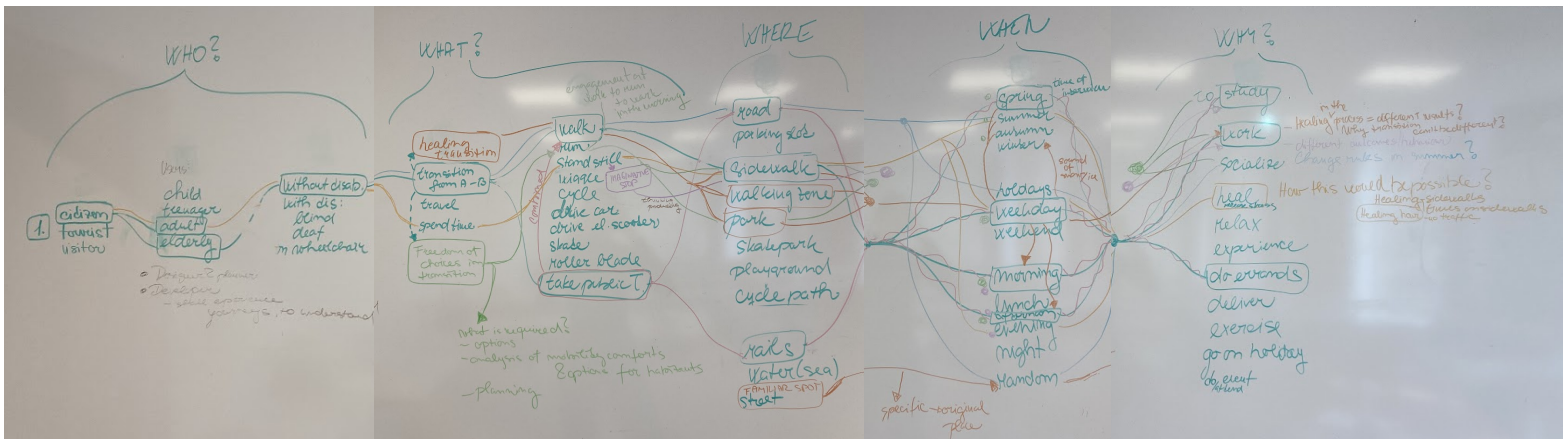


Figure 47 - Barriers and drivers dynamics with variations


Pedestrian

Points with potential

The next natural step involved transferring the identified variables from the previous exercise onto a large canvas, allowing for the visualization of connections between factors that influence the microsystem. A ZIP analysis was then conducted to identify areas requiring further research (Z), points of intervention (I), and potential problems and opportunities (P) (Sevaldson, 2012). The selection of these points will be elaborated on in the solutions space chapter. Figure 48 presents a draft of this process.

The final step in the systemic study originally involved the development of a model for envisioning futures (Jones, Ael, 2022). However, since this model overlapped with the subsequent intervention strategy, it was not further developed. The outcome can be found in the appendix. Despite not being a part of the report, the model played an essential role in the process of understanding.

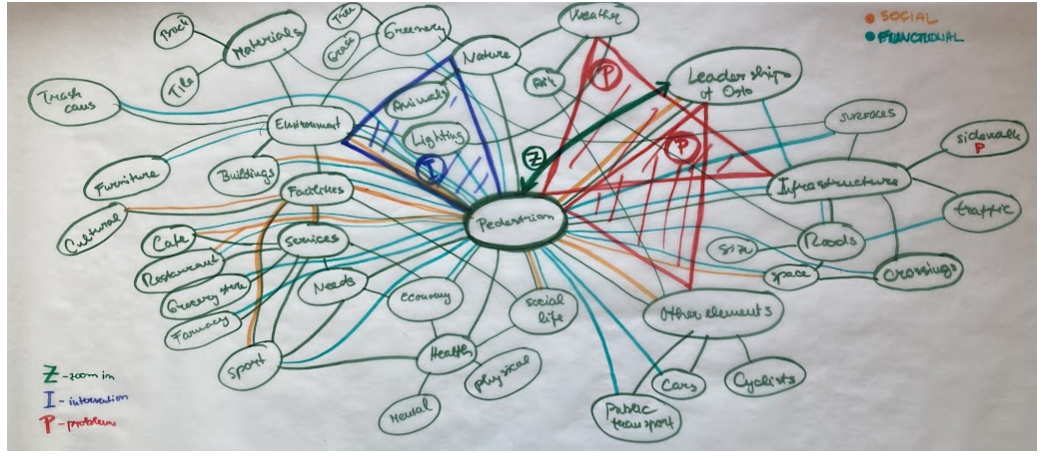


Figure 48 - Relations between system factors

6
SOLUTION SPACE

Intervention strategy

Once the ZIP points were selected, the next step involved developing an intervention strategy to guide their development (Jones & Ael, 2022). It was based by the questions developed from survey results and the Iceberg model. The purpose of this strategy was to practice the skill of zooming out and gaining a broader perspective. It aimed to understand the collective goals and aspirations for the system. While the exact placement of the bubbles representing the leverage points may not be certain, they encapsulate thoughts associated with each leverage point (see Figure 50). This is just one example of how a specific systemic design model provided a framework for comprehending the topic, with lines between the listings indicating possible correlations.

In the solutions space, the following ZIP points will be further elaborated upon:
A. (P) Other elements of transport - examining how different user groups are prioritized within the infrastructure compared to the real environment.
B. (Z) Research and decision-making - exploring the involvement of pedestrians in shaping the city.
C. (I) Environment - considering contextual aspects, with a focus on nature as a key driver for walking.
D. (P) Weather - exploring the potential relationship between citizens and weather events.

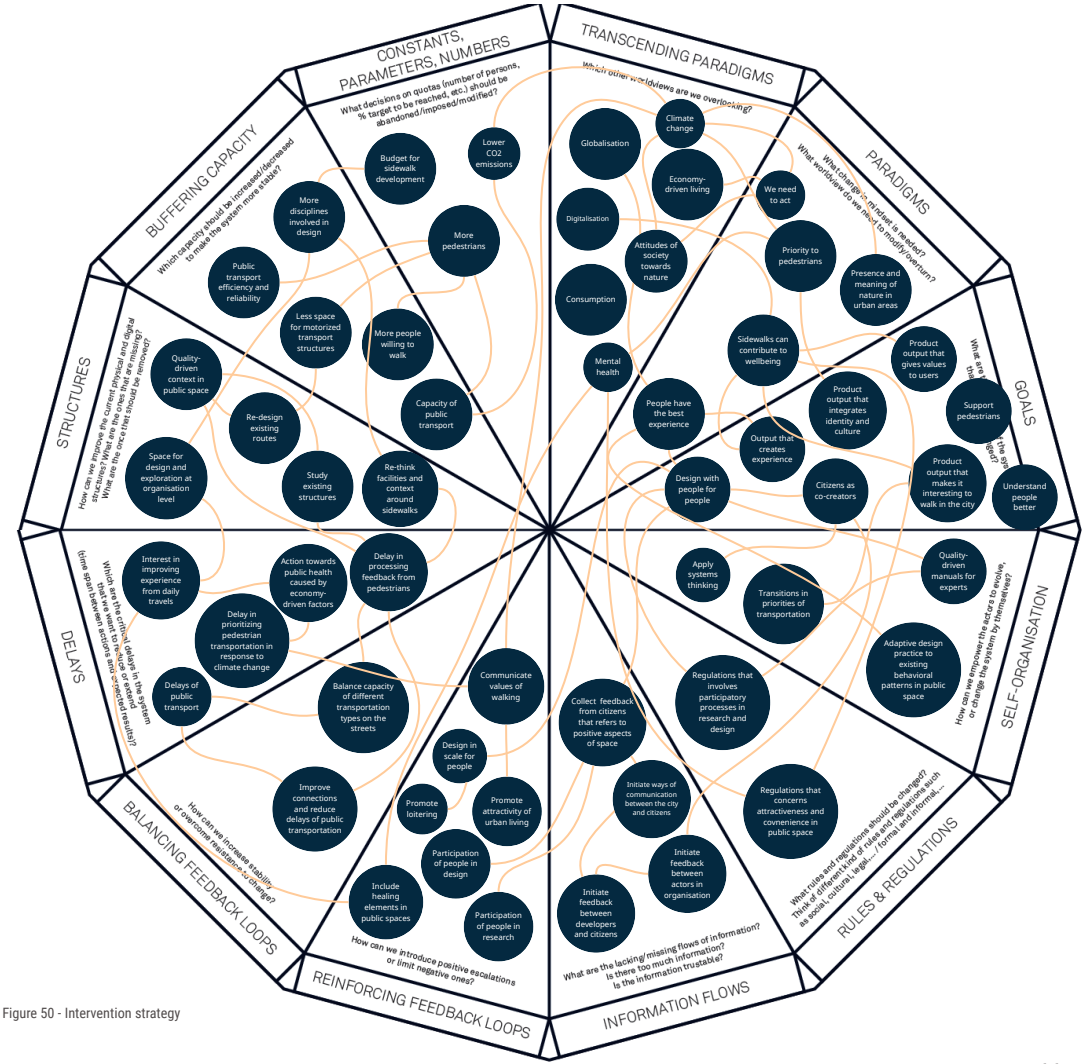


Figure 50 - Intervention strategy

Introducing concepts

Based on the types of interventions, three distinct approaches were designed for the solution space (see Figure 51):

A - Mindset of the city

Concept A is based on systems analysis and discussions with The Agency for Urban Environment (Personal communication, April 2023). It aims to initiate a discussion about the future mindset of the city and how it can respond to social needs of society. The map of relations between actors and feedback loops serves as the foundation for this concept. The city should have a clear plan for addressing the future and aligning with social trends in Norway. Concept A highlights the importance of prioritizing pedestrians in urban infrastructure and serves as the basis for the following concepts B, C, and D. Together, these concepts present a journey towards the future walkability program of Oslo.

B - Participation

Understanding how quality is perceived in cities provided a foundation for this concept. The rules governing the infrastructure give insights into how the city establishes dynamics between different user groups. Additionally, there is a need for different kinds of feedback loops from pedestrians. In response to this, Concept B emphasizes the way of doing so.

C - Attractiveness

An identified gap in the existing design manual is the lack of context identifiers of attractiveness and comfort. Concept C was developed with the goal of actively engaging the presence of people on the streets by enhancing attractiveness and comfort in the urban design.

D - Care

The experience in Barcelona led to an exploration of communication gaps between the city and pedestrians. The survey revealed that the weather is perceived as the most significant barrier to walking. In response to this, Concept D delves into how the city can effectively communicate its willingness and efforts to address and care about issues related to the local context.

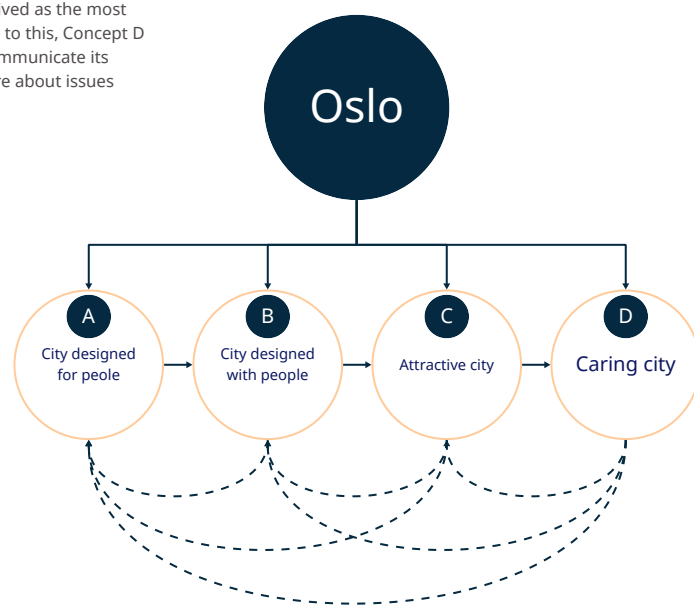


Figure 51 - Strategy framework of concepts

A Oslo, city designed for people

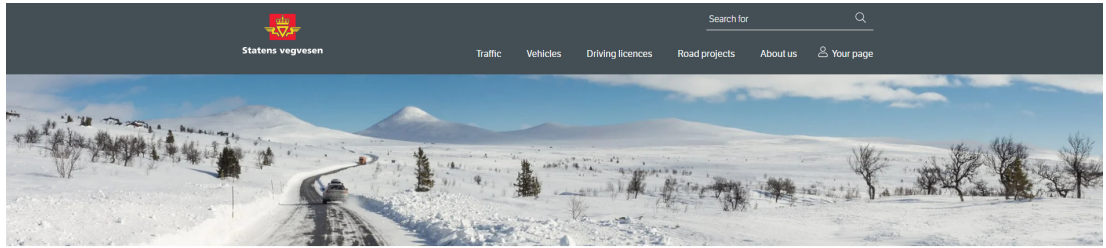
After engaging in a discussion with the representative of The Agency for Urban Environment, it was recognized that it is crucial to establish clear goals for Oslo's future walkability program. All the municipal agencies that are impacted should share the responsibility of adjusting their structures and implementing necessary measures. The handbook for public spaces in Norway provides models for shared responsibility and can serve as a valuable resource (Kommunal- og moderniserings departementet, 2019). Information about the national walking strategy can be found on the website of The Norwegian Public Roads Administration (Statens Vegvesen, 2012).

Up to this point, sidewalks have been designed around motorized infrastructure. However, to shape Oslo's collective mindset, pedestrians must be given priority. By adopting a reversed thinking approach to transportation, future goals related to climate and social sustainability can be empowered. This shift in mindset can transform the city's identity and how it is perceived by the public. The concept proposes that pedestrians should be an integral part of Oslo's identity. Their active contribution is explained in concept B.

A scenario was crafted to envision the application of radical revision to the existing communication system for roads. The existing online platform was adapted into a platform dedicated to sidewalks (Statens Vegvesen, 2023).

Screenshots and contents from the original platform were reimagined within the context of sidewalks using the principles of critical design. This exercise aimed to question and challenge the approach towards two distinct user groups: car drivers and pedestrians (Mallpass, 2016). The result is shown on pages 69 and 70.

The existing online platform that address walkability topics, developed in collaboration with The Norwegian Public Roads Administration and The Institute of Transport Economics, serves as an informative reference point for public (Tiltakskatalog for transport og miljø, 2019).



Shortcuts

Check vehicle information

Book or change an appointment

A logo should be developed to support the walkability program.

Traffic information

Sharing information through maps.

Context included on the platform

Actors that support and enable walkability program

Existing actions about walkability

Contact with the organisation

Is the road closed?

Now you can receive an SMS notification when the country's most landslide-prone and closure-prone roads have to be closed.

Order SMS notification

Is the sidewalk closed?

Now you can get an SMS notification on when and where there are ongoing construction works on sidewalks

Order SMS notification

Map of construction work here

See map of construction works

What kind of obstacles pedestrians overcome daily in the streets?

How these obstacles are communicated? What kind of information related to sidewalks reach out to pedestrians?

To promote the new mindset, a t-shirt titled "I also walk" was created, drawing inspiration from the principles of critical design (Malpass, 2016). The intention was to initiate new forms of discussion among citizens, fostering support for the overall strategy and common goal. The t-shirt could potentially become part of a future campaign illustrating Oslo's plan to become a sustainable city designed with a people-centered approach, taking into account various scales of urban development. The result shows support to those that walk, and possibly criticize those who do not.

B Oslo, city designed with people

In PhD project, Methorst explores the various contextual factors that influence our inclination to walk, ranging from a strong aversion to walking to a delightful walking experience (Methorst, 2021). In Figure 53 of his model, he presents a hierarchy that begins with feasibility and accessibility, progresses through convenience requirements, and culminates in enticing arrangements that contribute to a positive walking experience. These two areas, characterized by their specific attributes, present opportunities for further interventions. Methorst's research also highlights the distinction between irritations, which may not discourage pedestrians from walking but do impact their attitudes, and annoyances that exceed tolerable levels. Comfort emerges as the second most influential factor on the scale towards a pleasant walking experience, while attractiveness takes the top spot. Attractiveness embodies an element of pleasant surprise with an effect that is less predictable. However, the essence of attractiveness extends beyond pedestrians' self-reflection and awareness. Both these areas are connected to the specific situational context that captures pedestrians' interest.

Subjects in literature

There is a significant body of published literature addressing various aspects of walking and sidewalks. Through the study of this literature, researchers can identify gaps in knowledge regarding pedestrians. Methorst's work, for instance, examines a selection of documents and categorizes them into different groups, providing an overview of the research that has been conducted (Methorst, 2021). Similarly, in this project, a few specific documents were reviewed, primarily focusing on the Oslo context and addressing the situation of interest from various perspectives. These documents encompassed topics such as the desired qualities and values of public spaces, technical parameters for sidewalk design, and recommendations at the two-dimensional level, with an emphasis on excluding user experience. As a result, this project underscores the existing gaps in understanding and knowledge related to public spaces. The scope of these gaps is visualized in Figure 54.

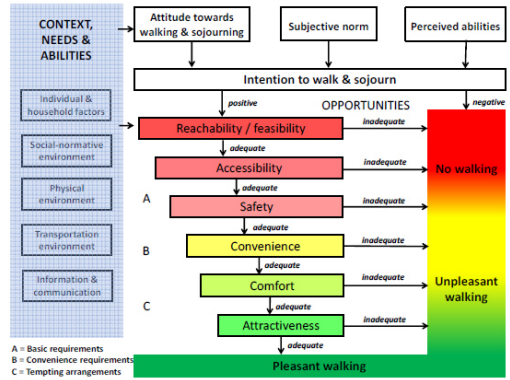


Figure 53 - Conceptual model developed by Methorst in 2021

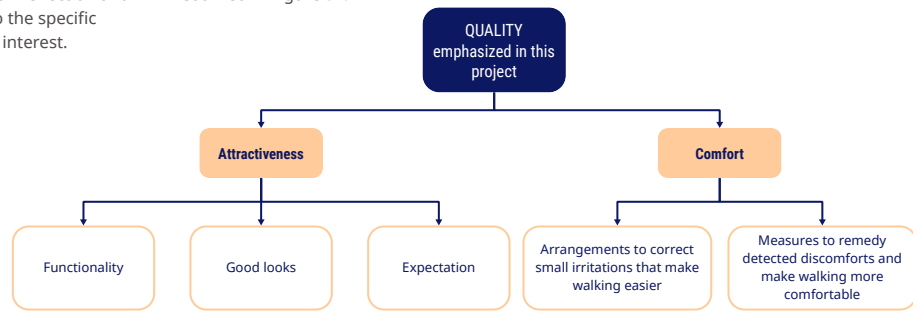


Figure 54 - Qality gaps that this project covers

Concept B, as implied by its name, focuses on engaging people in understanding and shaping the urban environment. Pedestrians are actively involved in the research through visually-driven methods, and the step-by-step process is outlined in Figure 55.

The inspiration for Concept B stems from a project PALMA, a collaborative effort between local developer, Corwin, and an architecture firm, Gehl Architects (Corwin, 2020). One of the project's initiatives involved creating maps for pedestrians with various themes. These maps included information about architecture, art, and other points of interest in public spaces along the routes. Figure 56 showcases a photo of a market map that features three routes within a specific area, highlighting famous historical buildings, gardens, a cemetery, and a square along the way. This method of providing contextual information to citizens adds to the attractiveness of the routes.

The focus of the concept was to find a way to achieve similar outcomes with the participation of people. An exercise was conducted within the author's own context, aiming to map previously taken routes from the bus station to home. The study included factors such as time, distance, and facilities available along the sidewalk. Experiences from walking were categorized into irritations and attractiveness, and some of these aspects influenced decision-making processes.

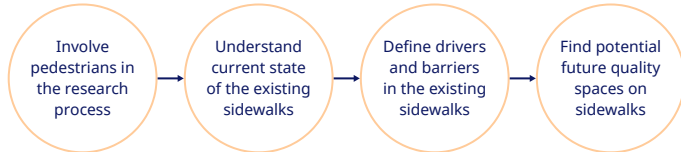


Figure 55 - Steps to identify fragments of quality that includes attractiveness and convenience and further process

Figure 56 - map showing routes to get to markets (Corwin, 2020)

"How is it that love expands intelligence? It has to do with vision - not eyesight, but that which we mean when we exclaim, “I see!”... "

(Romesin & Bunnell, 1999)

Mapping process

To illustrate the concept, the various journeys taken by the project author from the bus stop to their housing were mapped out in Figure 57.

A - route through the park
Attractiveness: sushi restaurant on the way, grocery store
Irritations: road crossing with traffic lights, walking up the hill, tram rail crossing

B - route around the roundabout
Attractiveness: fresh vegetable market, grocery store, road crossing without traffic lights, pharmacy on the way, cafe at the corner
Irritations: tram rail crossing without traffic lights, crowded sidewalk at the roundabout, must get ahead of people walking in different pace

C - route down and up the hill
Attractiveness: two grocery stores on the way (one with better quality goods, one with cheapest goods), pharmacy on the way, cafe at the corner
Irritations: trespassing crowded roundabout, walking home up the hill

D - route up and down the hill
Attractiveness: walking by the trees and kindergarten and park, nice to walk by in the summer
Irritations: walking up the steep slope and then down the steep slope, not good in winter as the surface is icy and slippery

E - forest route
Attractiveness: walking through forest and park in between trees, nice view of the city from the hill, walking slightly uphill but then only down the slope, good route to relax on the way home and just be on my own, no people
Irritations: steep terrain, not good for shoes, can be muddy

F - village style route
Attractiveness: memories of childhood from the village environment, not busy
Irritations: route feels long and there are no facilities on the way

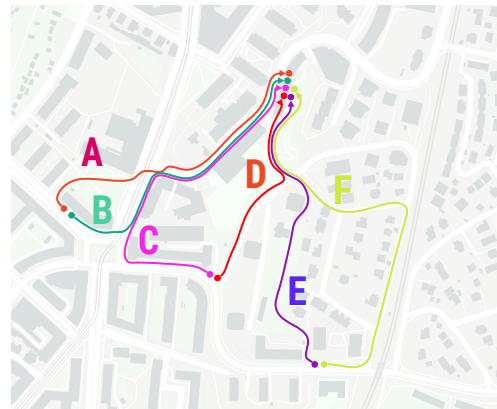


Figure 57 - Mapping routes at Carl Berners Plass, Oslo

Next step of the exersice was to select routes based on frequency of use, and preference. This selection is shown on Figure 58.

Most frequently used:
A - route through the park
Why?
Fastest

Most favourite:
E - forest route
Why?
Relaxing - nature elements

This exercise delves into the description and perception of pedestrian routes. It showcases the most frequently used path, which represents the quickest way to reach home, as well as the most favored route that highlights the influence of natural elements. It also identifies the factors that play a significant role in daily decision-making and their importance. By conducting workshops involving user participation, sidewalks in different districts of Oslo can be mapped. These workshops could be conducted in public libraries, providing a platform for citizens to share their insights and experiences. Understanding the context of sidewalk surroundings can provide valuable insights into their attractiveness and convenience. A visualization demonstrates suggestions on how these aspects can be explained, serving as a foundation for developing methods to collect data collaboratively with citizens. Maps serve as a visual tool that facilitates easy interaction and have proven practical in previous urban-driven projects at OsloMet.

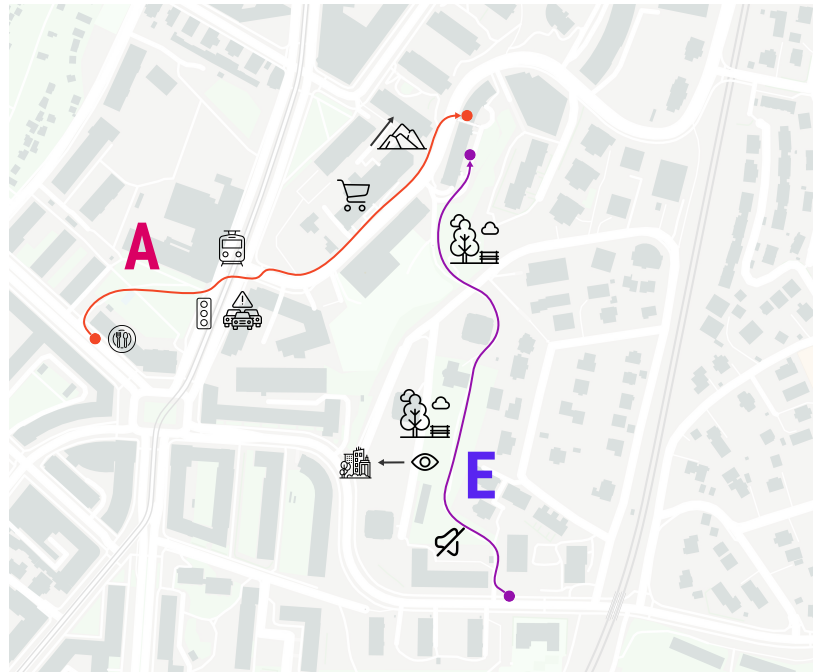


Figure 58 - Selected routes

To conduct further process, a strategy was developed, and its visualization is presented on the page 78.

Research:
The concept proposes the involvement of citizens in the mapping process. In order to create well-functioning and appealing public spaces, convenience and attractiveness must be integral parts of the design process. This involves exploring questions such as which contextual factors like buildings, traffic, facilities, nature, and other active or inactive elements influence pedestrians and what way.

Mapping and Clarification of Diverse Drivers:
Identify and clarify the pillars that contribute to a quality-driven context. These play a role in creating a desirable environment.

Testing the Drivers:
Implement short-term interventions in public spaces that amplify the desired contextual drivers (Concept C). Study the changes and the impact of these interventions, observing how they affect the environment and the behavior of pedestrians. By following this process, the program aims to gain insights into how different factors influence the quality of public spaces and to test the effectiveness of interventions in creating desired contexts.

The strategy operates in form of loops to ensure effectiveness and improvement. The loops are as follows:

Process Loop:A correctness test to validate whether the identified context drivers address the gaps in theoretical knowledge. It involves continuously assessing and refining the understanding of these drivers.

Feedback Loop 1:Examines the effects of intensified drivers implemented in public spaces. It evaluates how these interventions impact the desired contextual factors, assessing their effectiveness and making adjustments as necessary.

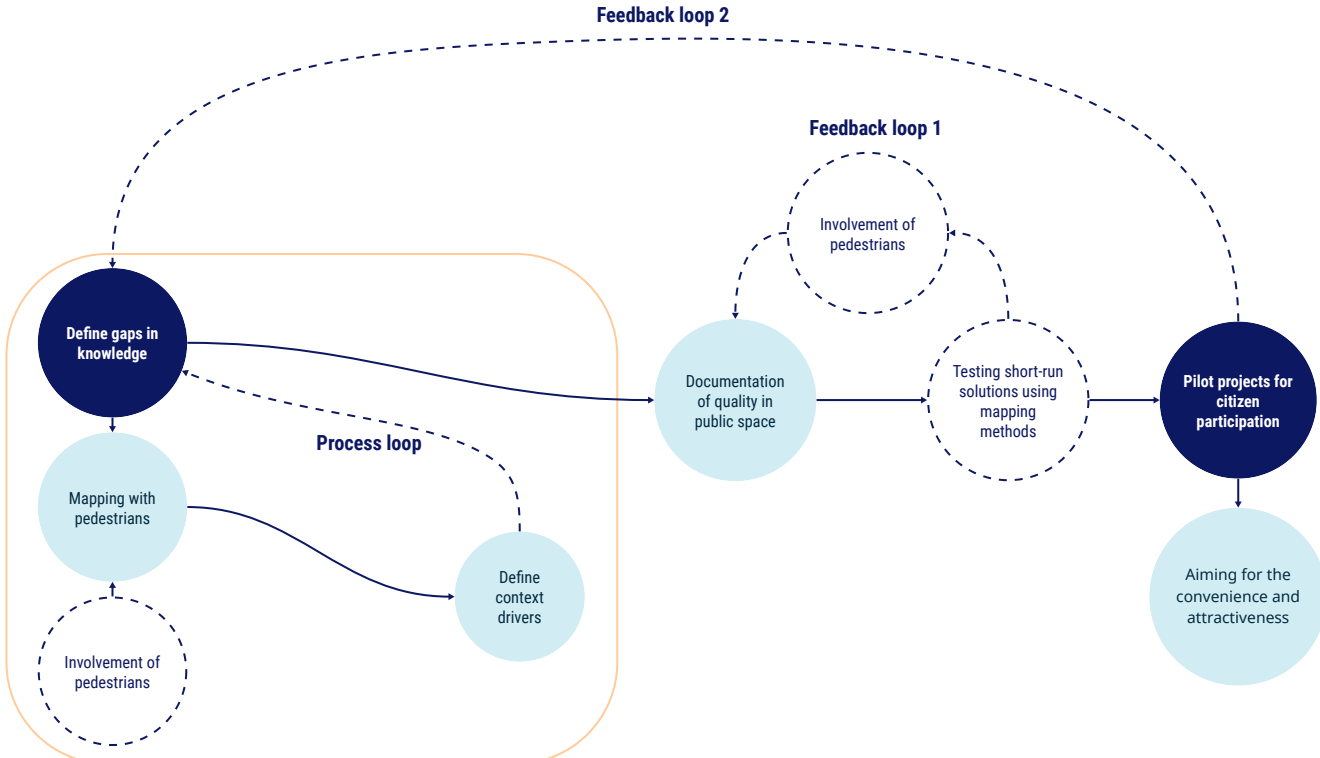
Feedback Loop 2: This loop focuses on whether the pilot project addresses the gaps in theoretical knowledge about urban development. It explores a generative approach to collecting data and seeks to refine and reuse methods based on the feedback and insights gained.

To test different methods of engaging people in the process, a pilot project will be implemented. This pilot project marks the initial step of the official investment regime (Figure 59) at The Municipality of Oslo. Given the challenges of incorporating participation of citizens, it may be necessary to reconsider the existing processes at the organizational level (Personal communication, May 2023).

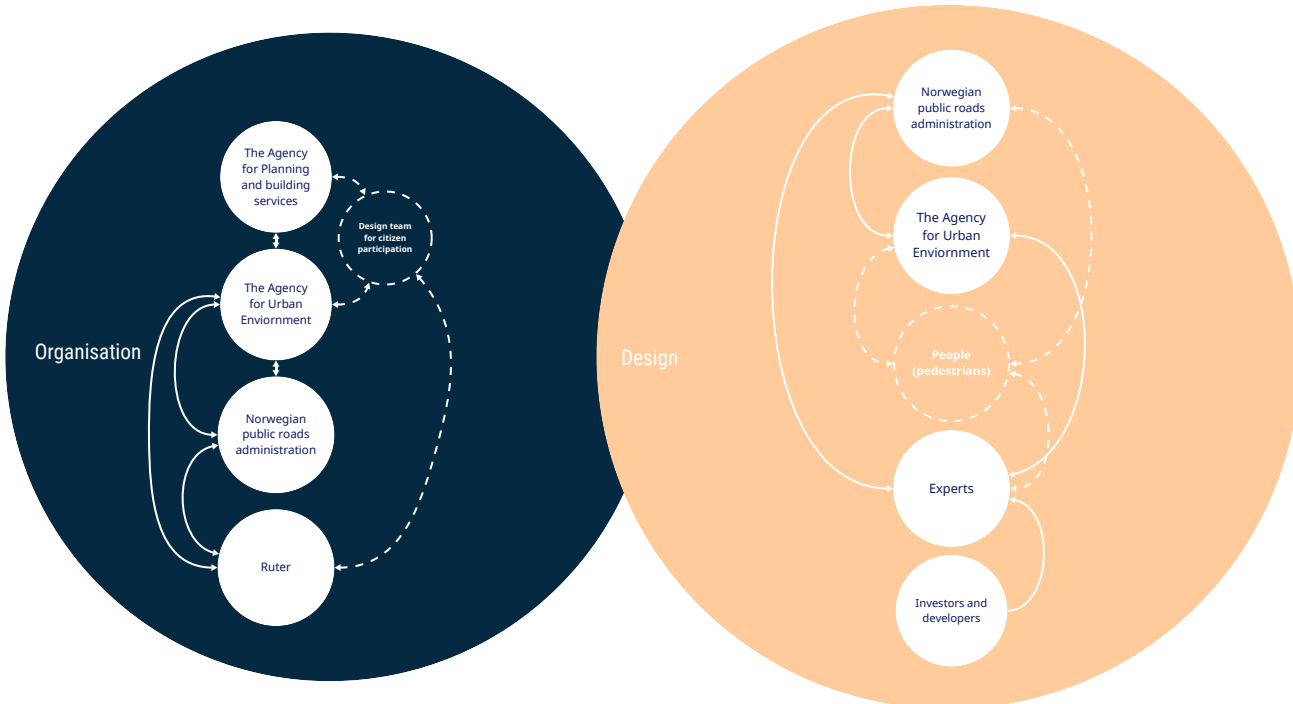
Solution
The concept's integration into the organization is outlined on pages 78 and 79. It proposes the inclusion of new context-related elements as a requirement in the sidewalk design process. It is crucial for developers to further explore and implement these insights. To tackle complex problems, various solutions can be tested, drawing inspiration from the concept of wicked problems (Rittel, Webber, 1973). Temporary interventions in public spaces, such as pilot projects, can facilitate the development of new methods specifically tailored to the Oslo environment. This approach is inspired by the learning laboratory model, a computer-based tool that establishes a feedback loop between experimentation and reflection (Kim, 1992). The intervention serves as the experimentation phase, followed by reflection and discussion to enhance the learning process.

Figure 59 - Investment regime process

Dynamics of the concept within the organisation structure



Changes within the organisation



New actors are shown in the dashed lines circles

Dashed lines represent new relations derived from the concept B

Already existing communication

To foster motivation among citizens and encourage their active participation, a similar principle as in concept A was applied. The t-shirt titled "I make Oslo" serves as a symbol that can carry multiple meanings. Within the context of this project, it represents the direct involvement of individuals in shaping their city (Malpass, 2016).
The t-shirt aims to evoke a sense of wonder and curiosity, prompting questions such as how such involvement is possible and how the person wearing the t-shirt became part of it. This creates an opportunity to consider the distribution of these t-shirts and where citizens can obtain them. One suggestion is to provide them to individuals who actively participate in workshops, serving as a token of their engagement and contribution. By wearing the t-shirt, citizens can proudly display their role as active creators of Oslo, further promoting a sense of ownership and empowerment. It serves as a tangible reminder of their potential to make a difference and encourages others to join in the collaborative efforts of city-making.

C Oslo, the attracive city

The concept draws inspiration from the publication "50 Things to do in the urban wild" by Clare Gogerty (Gogerty, 2022). It proposes viewing the city as an exciting environment that incorporates nature-driven elements in areas. These can be referenced in the urban maps of concept B. The survey conducted for this project revealed that nature serves as a motivating factor for walking, which can be leveraged to transform the surroundings of sidewalks into sensorially engaging and aesthetically appealing spaces to pass by throughout different times of the day.
Figures 60 and 61 illustrate how the urban environment can be interwoven with nature. Gogerty's publication presents a collection of ideas on how to make the city more exciting. Among the various options, the following examples could be considered as viable building blocks for this concept:

1. Leaf journal: Encouraging people to explore different routes with the aim of collecting various types of leaves.
2. Photograph four seasons: Motivating individuals to revisit a specific location to capture its appearance during different times of the year.
3. Bring nature indoors: Collecting seeds from parks and planting them at home in pots, fostering a connection with nature.
4. Cloud spotting: Identifying locations that offer excellent sky views for observing clouds, stars, or even phenomena like the northern lights.
5. Create an urban nature map: Seeking out patches of wilderness within the city and providing individuals with a manual on how to create their own nature map, as outlined by Gogerty.

By integrating these activities into the urban fabric, the concept aims to enhance the overall urban experience and foster a deeper connection between individuals and the natural elements within the cityscape.

Figure 61 - Brussels, Belgium

Figure 60 - Nafpilo, Peloponnese, Greece

Taking inspiration from Gogerty's ideas, a test was conducted to explore solution number 3. In this test, five seeds that were found scattered randomly in Slottsparken (Oslo) were collected and planted in a pot at home. Over the course of the first two weeks, three of the seeds successfully sprouted, eventually identified as maple trees. Figure 62 showcases the outcome of this test after three weeks.

Figure 62 - The pot with maple trees that grew from seeds collected in the park

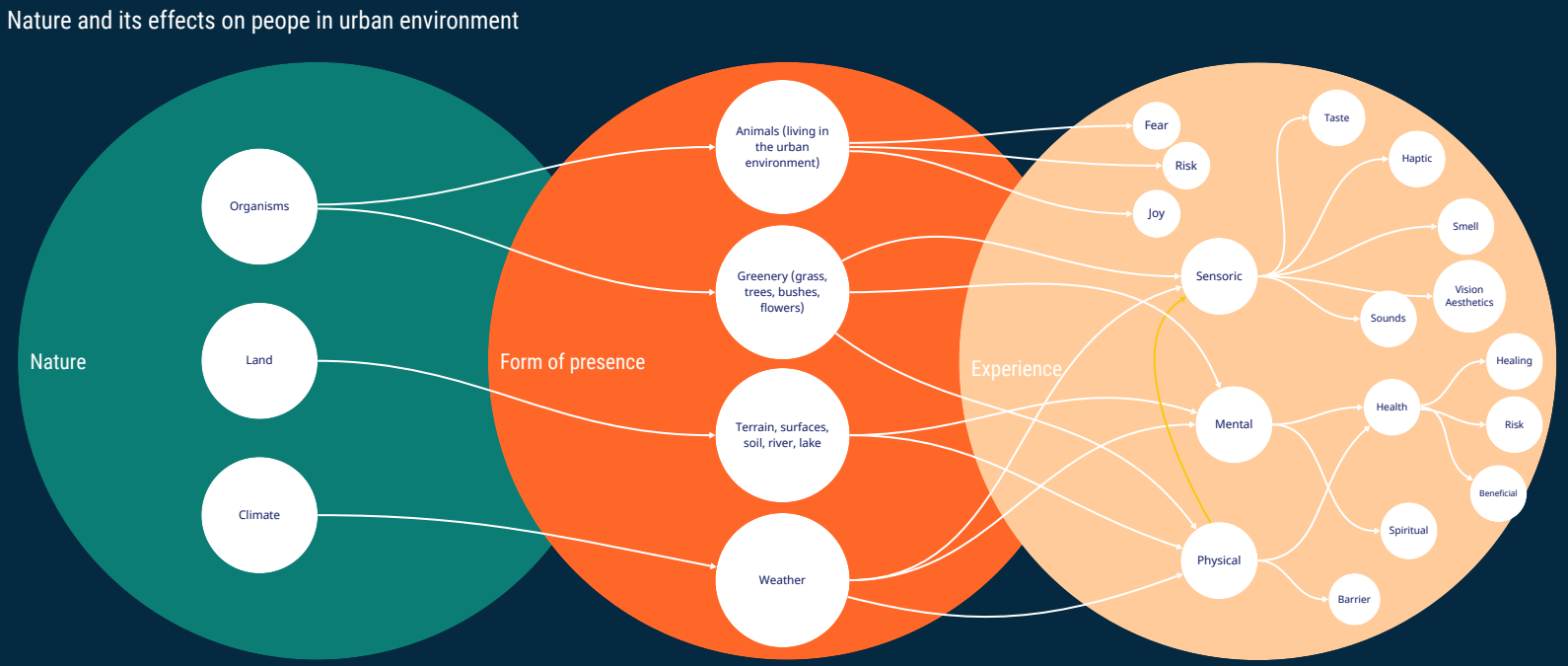


Figure 63 - A model to explain forms and effects of nature on pedestrians

Figure 63 presents a model illustrating the various effects that nature can have on urban society. This model serves as a preliminary demonstration for potential system analysis. Different design methods can be employed to comprehend the presence of nature in the urban environment. The model, from left to right, embodies ecosystem, forms of nature, and the experience that it produces. This provides a visual representation of the interconnected relationship between nature and the urban setting.

On the next page in Figure 64 and 65, AI generated images show the application of the concept in the context of Oslo. A prompt that transform road into sidewalk is envisioned, surrounded by the trees, plants and cafes. The point is to show the atmosphere of this context.

Figures 64 and 65 - "Road in Oslo that has been transformed into sidewalk, where people spend their time. There is a cafe, restaurant, trees and grass around the sidewalk." - AI generated image (Midjourney)

D Oslo, caring city

The impact of weather on walking emerged as a barrier, prompting an investigation into pedestrians' perceptions. In Barcelona, streets are heavily influenced by the weather and the sky. Concept D proposes shifting prejudices towards weather to enhance connection with the city's climate. Winter months in Oslo present challenges in street maintenance due to snow. The primary focus was to identify the factors that contribute to weather-related discomforts and explore the potential for this concept. The strategy steps of this concept are visualized in Figure 67.

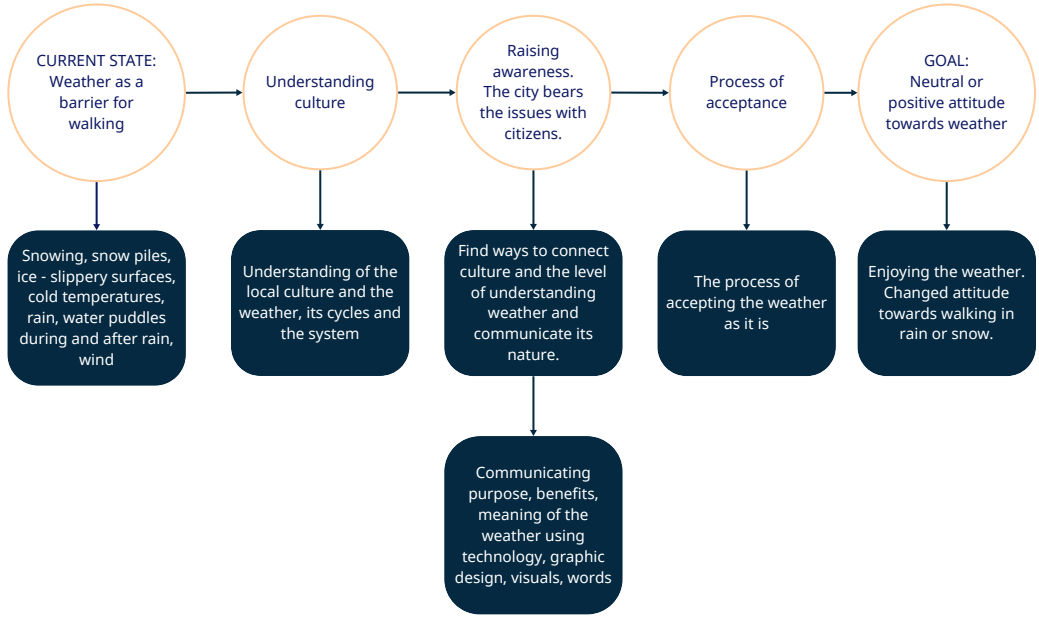


Figure 67 - Strategy of the concept D

" Det finnes ikke dårlig vær, bare dårlige klær."

Weather as a culture

Weather is an integral part of Norwegian culture as it significantly influences the daily lives and activities of its people. Norwegians have a deep appreciation for nature and the changing seasons, with outdoor pursuits such as skiing, hiking, and fishing, closely tied to weather conditions. The resilience and adaptability of Norwegians in embracing and enjoying various weather conditions reflect their strong connection to the natural environment.This page is an inspiration moodboard for further inetpretation.

Physical and emotional effects of weather on citizens

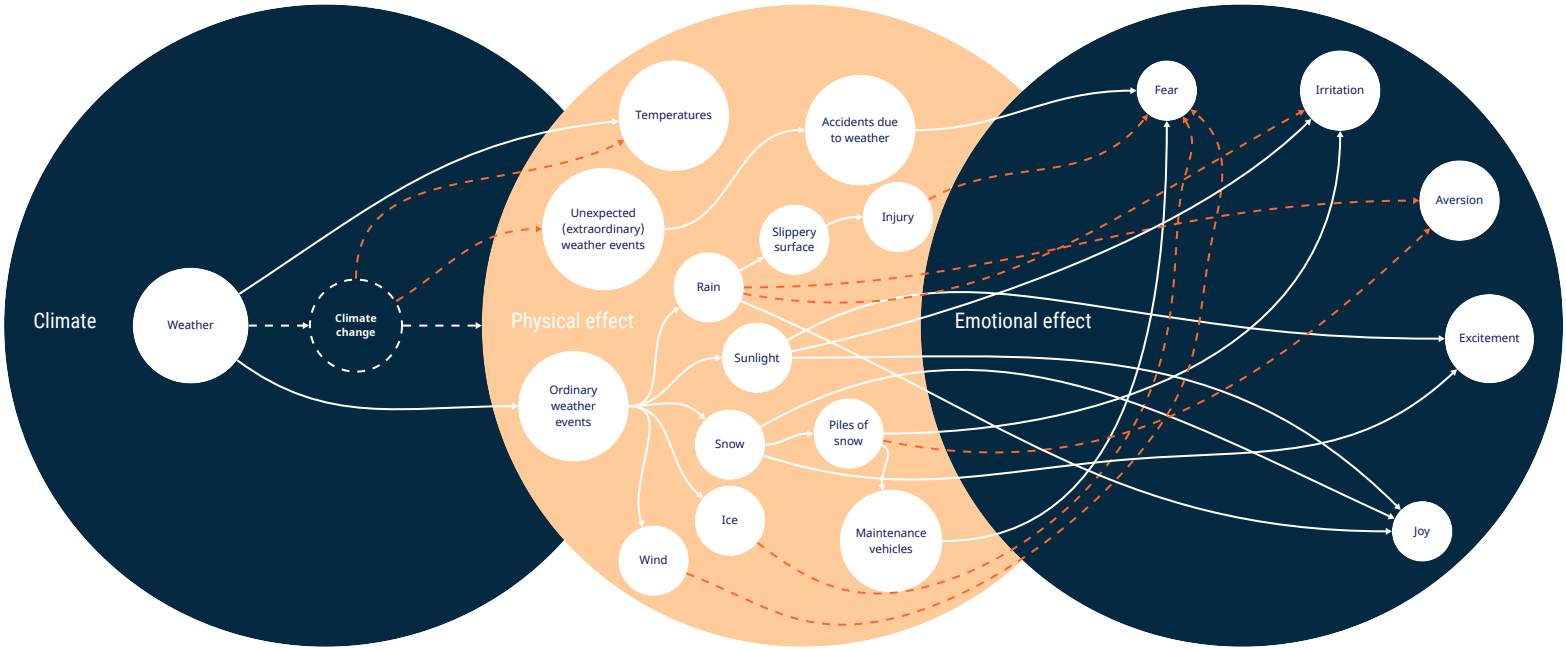


Figure 72 - Physical and emotional effects of climate on pedestrians

Weather influences our behavior by shaping our daily activities and choices. It can impact our mood, energy levels, and preferences, leading us to engage in different activities and adjust our plans accordingly. The model in Figure 72 shows the causes of climate in form of physical and emotional effects on people. Red dashed lines are there to highlight relations that has a potential for change in the future.

Red dashed lines represent a relation that has a potential to improve.
White dashed lines represent element that is unexpected.

Journeys to transition

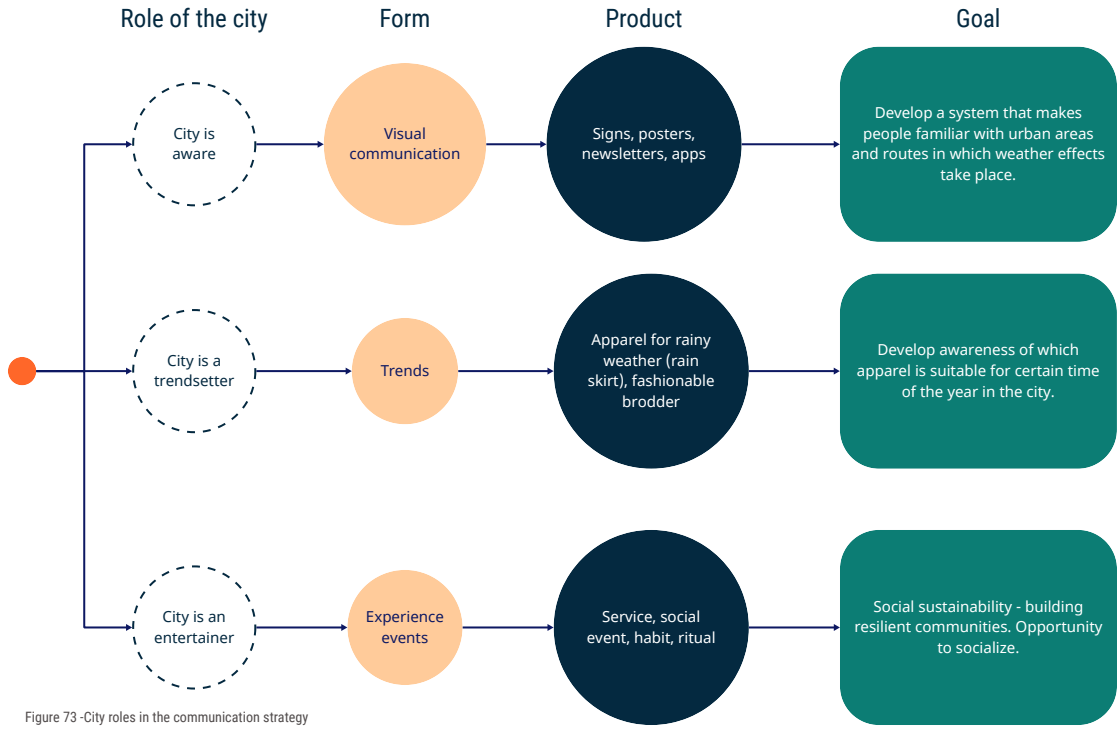
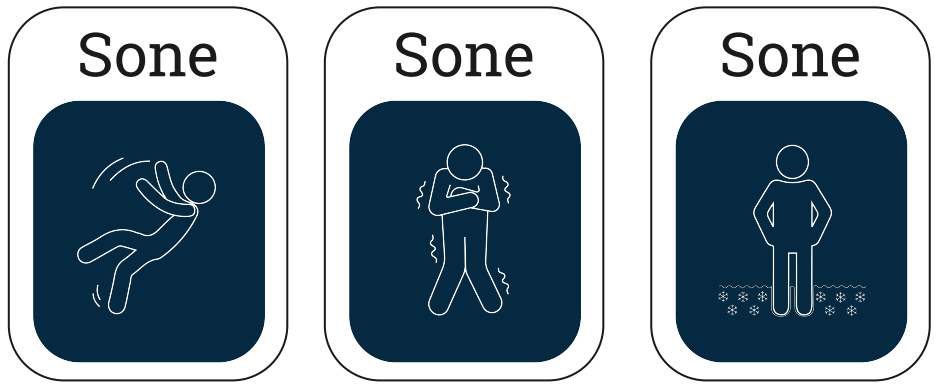


Figure 73 -City roles in the communication strategy

Concept interpretation

Concept D aims to uplift the attitude of citizens by addressing the challenges posed by weather conditions on sidewalks. The goal was to create a visual tool that demonstrates the city's acknowledgment of these issues, drawing inspiration from existing signs and icons. The concept explores the adaptation of zonation signs into urban versions, incorporating elements of weather events, humor, and cultural context. A set of visiuals on this page was crafted.



Impact analysis

The cybernetic approach of a processor service model was adapted to evaluate the potential impact of concept D and its implementation in public spaces (McWhinney, 2005). The visualization (Figure 74) illustrates the processes and dynamics involved before, during, and after the placement of visual elements on the streets. This modified model depicts the input of new physical or abstract elements on the sidewalk, their form, the resulting reaction, and the continuous loop of feedback. It serves as a starting point for discussions on how to address the negative experiences of walking in winter, break taboos, and explore the influence of weather. The involvement of psychology and sociology can further enhance understanding of the underlying triggers and facilitate improved communication between the city organization and its citizens.

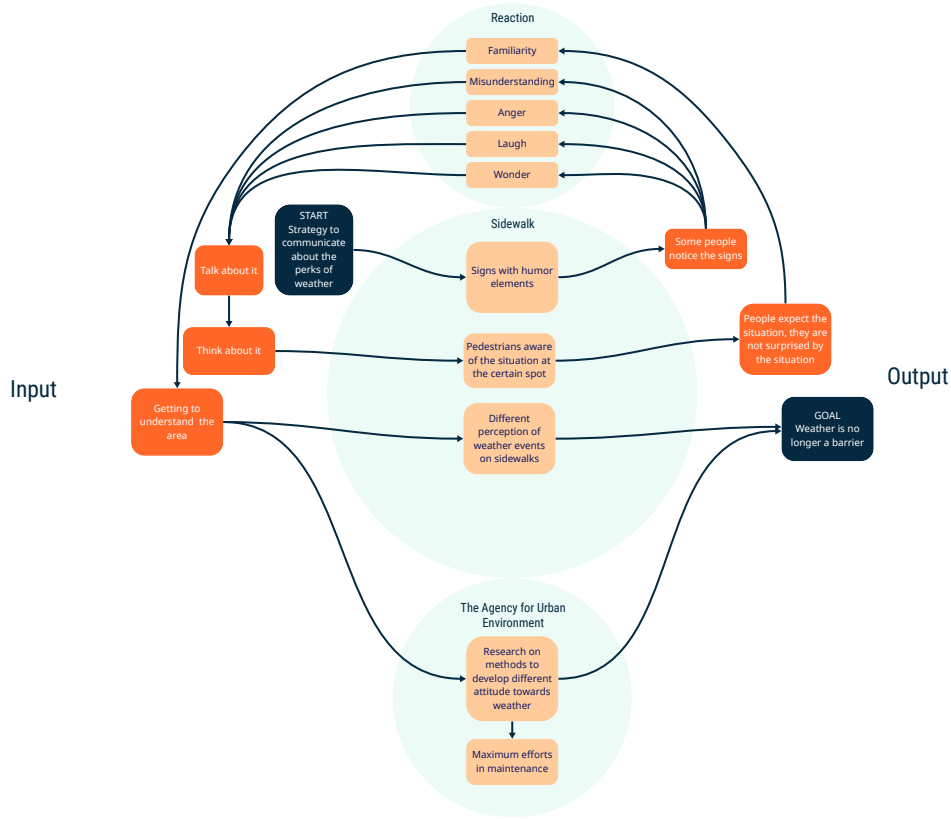


Figure 74 - Dynamics of the concept D on sidewalk

Envisioning futures

Concepts on a timeline

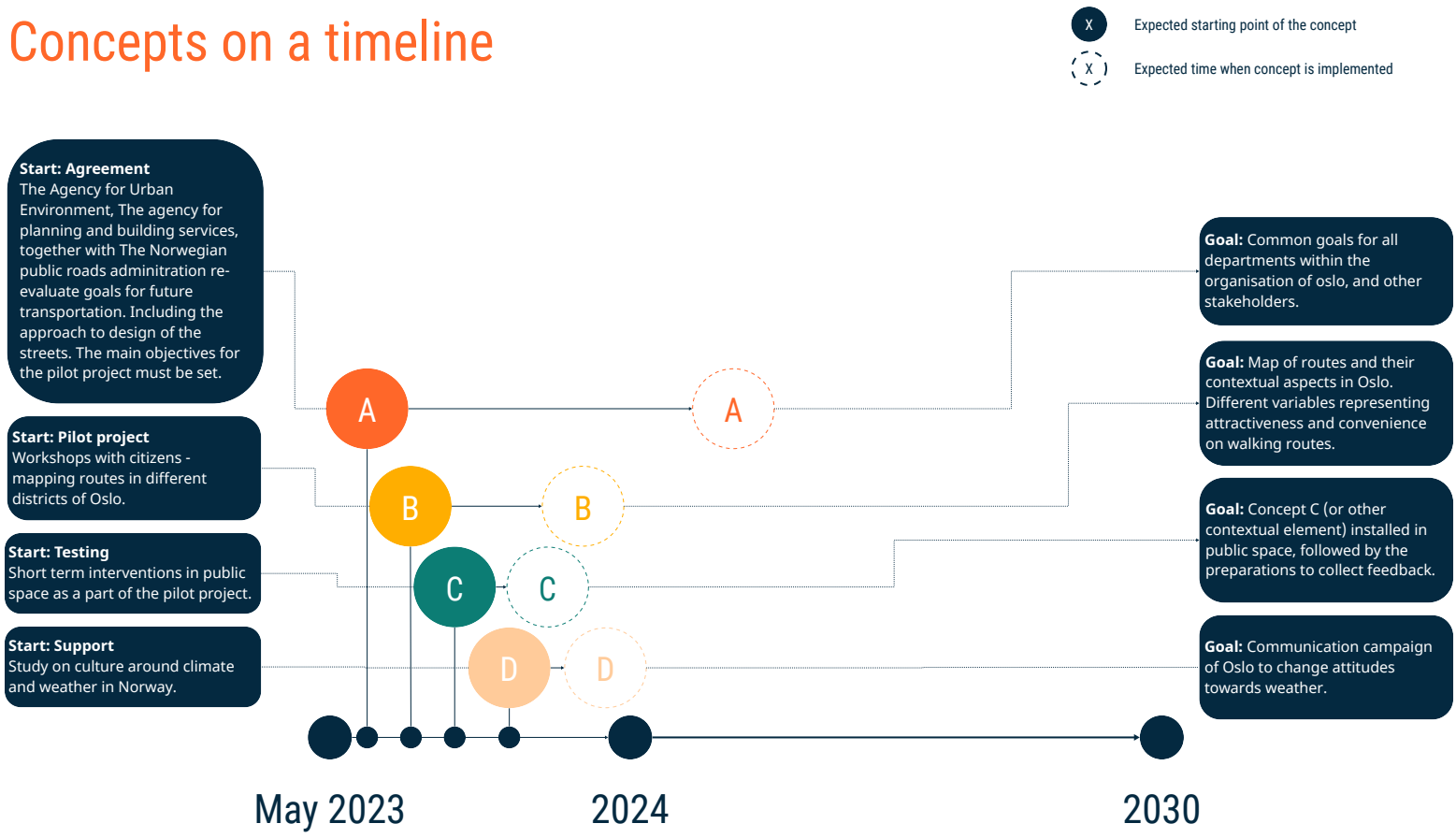


Figure 75 demonstrates the impact of interventions on the intervention strategy model (Jones & Ael, 2022). This visualization allows us to understand how the concepts align with specific leverage points in the strategy.

Concept A permeates all leverages of the strategy. For instance, within the constants, it addresses carbon emissions by promoting walking and enhancing pedestrian transportation. It also transcends paradigms by focusing on improving mental health and reshaping the areas that drive the economy. Moreover, the economy model itself can undergo transformation as different contextual factors surrounding sidewalks create diverse opportunities, leading to varied experiences and mindsets among people, thus necessitating distinct solutions.

Concept B emphasizes the engagement of people. By involving individuals in the process, significant changes can occur in the reinforcing feedback loops, strengthening their connection and responsibility towards the environment they inhabit.

Concept C influences the existing physical structures related to walking. It strives to generate outputs that enhance the quality and value of public spaces through creating a pleasant ambiance. Moreover, it impacts rules and regulations, as adjustments are implemented to accommodate these changes.

Lastly, Concept D shapes the ways in which pedestrians are supported and how the city interacts with them. It drives improvements in the city's outreach efforts.

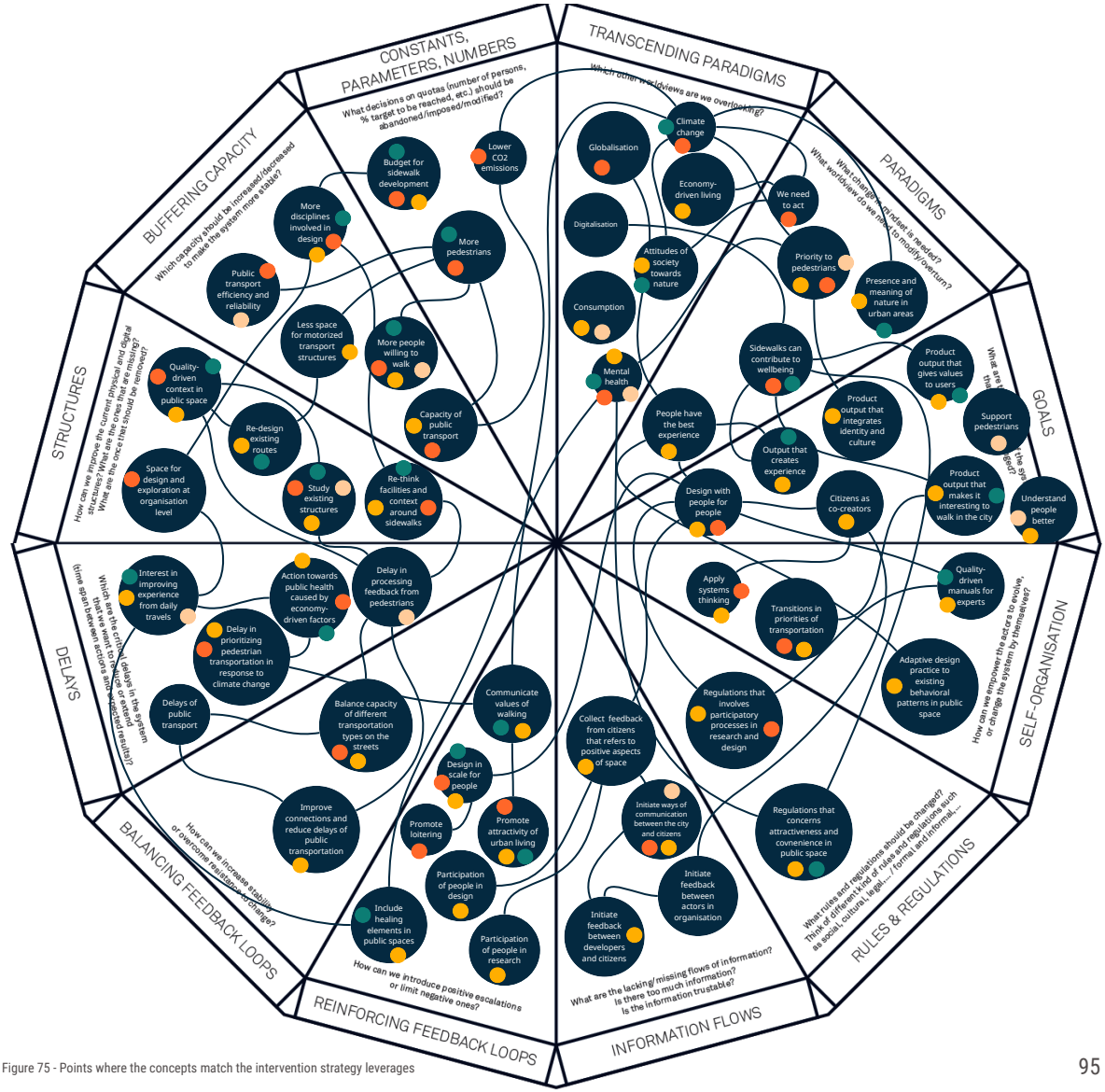


Figure 75 - Points where the concepts match the intervention strategy leverages

Figure 76 (Jones & Ael, 2022) provides an evaluation of the extent to which the designed concepts influence different leverages of the intervention strategy. Recognizing the challenges posed by wicked problems and complex systems, this model showcases how the concepts align with the strategy and the degree of their impact. It serves as a valuable tool in identifying areas where additional efforts can be directed to reinforce the strategy.

The model encourages the search for additional parameters that can contribute to the overall strategy. Specifically, under the goal of Oslo becoming a caring city, the model prompts consideration of which numerical values need to be adjusted. Additionally, it suggests a deeper exploration of balancing feedback in terms of attractiveness and care, emphasizing the importance of strengthening information flows to engage feedback loops. Rules and regulations should also encompass the considerations put forth by the concepts, reflecting a more comprehensive approach.

Furthermore, the model invites investigation into how the city can self-organize under these new circumstances. It raises questions about the potential for active involvement and self-organization among the citizens, enabling the city to receive nurturing feedback in return. This exploration could potentially lead to the establishment of a new feedback loop, fostering a mutually beneficial relationship between the city and its inhabitants.

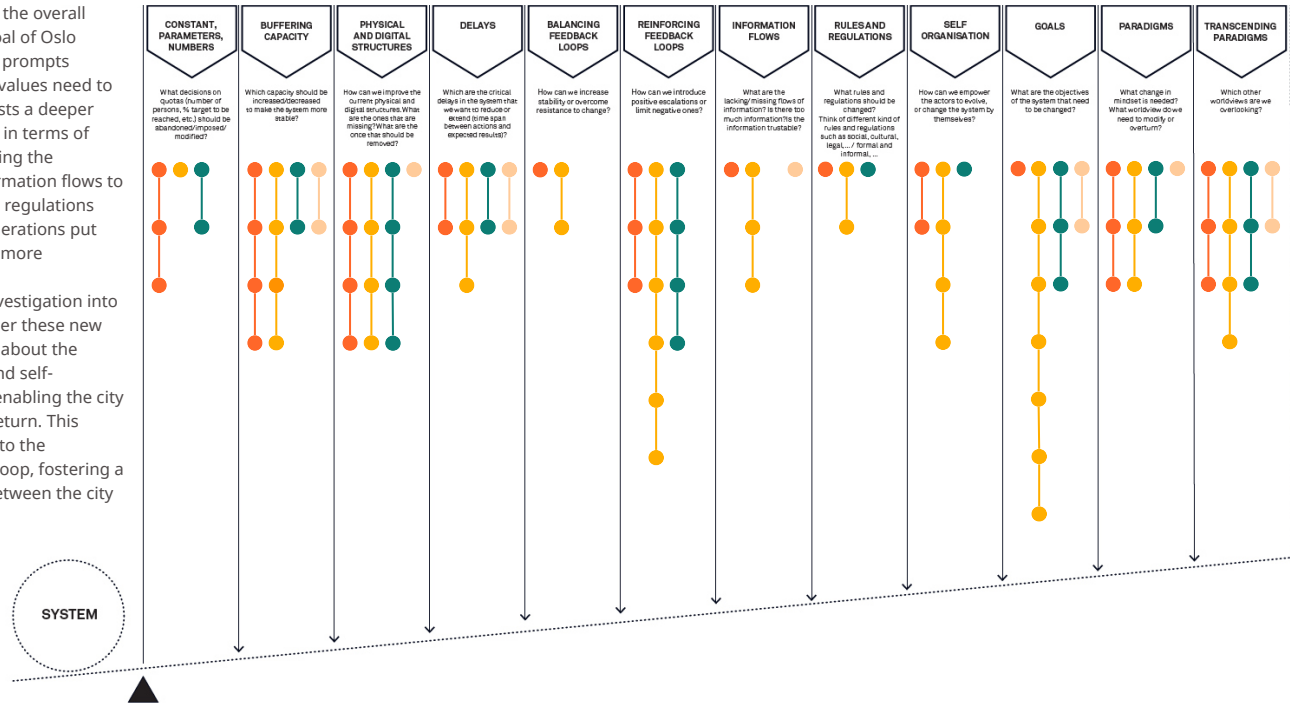


Figure 76 - Weighing presence of concepts

Situation of interest

To visualize the transformations within the current systems, a system dynamics model was created in Figure 77. It illustrates the potential changes that can arise from the implementation of the designed concepts across three key domains: the organization (The Agency for Urban Environment), the physical environment of sidewalks, and the individual citizens at the micro level. The elements located outside of three central circles represent the desired dynamics between domains.

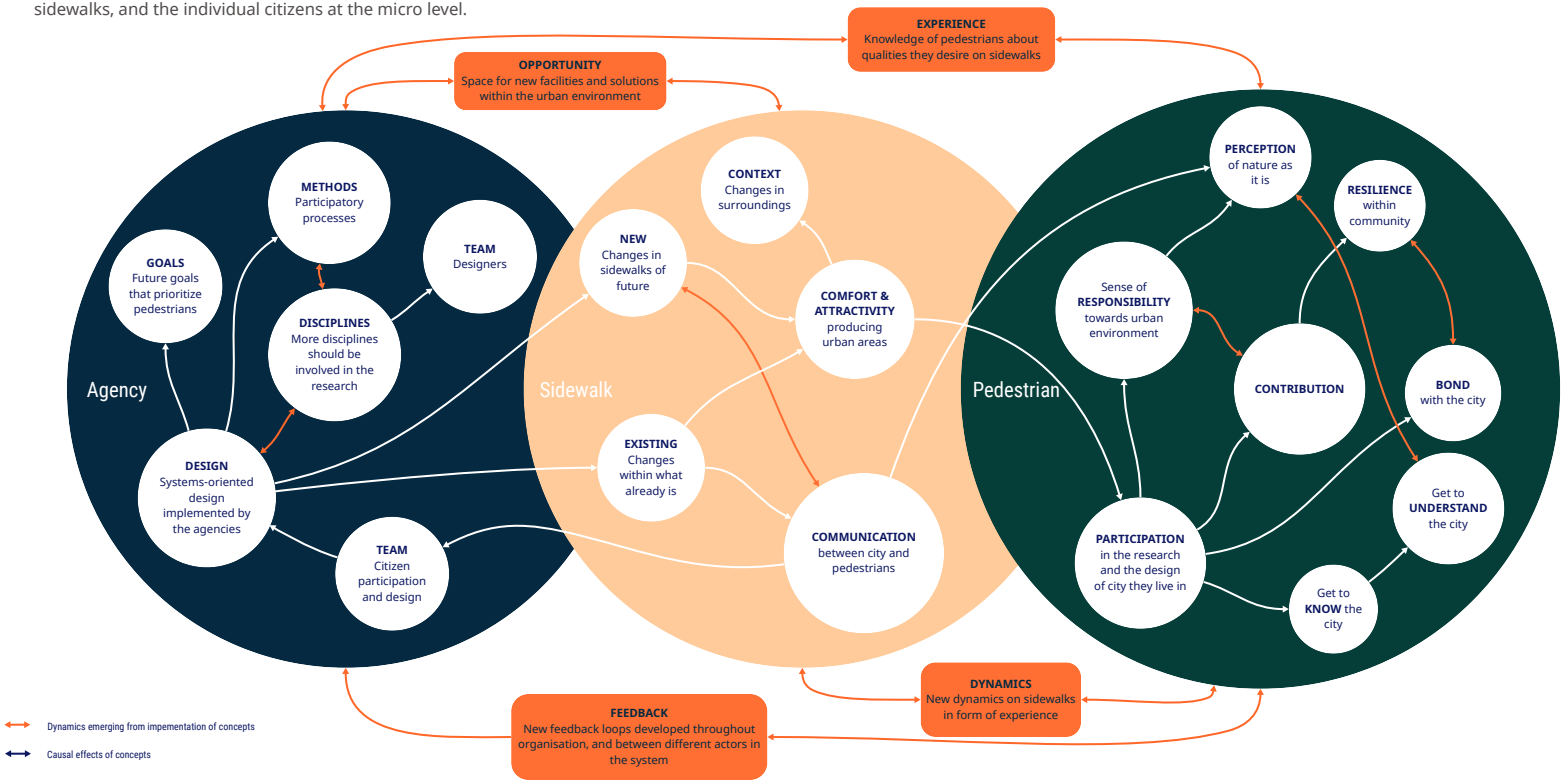


Figure 77 - Model showing dynamics between the municipality, sidewalk and the pedestrian

7 DISCUSSION

Working with the city's infrastructure was an ambitious goal for a product design student. However, it became evident, that this is a matter of systemic design. Shifting away from a narrow product-oriented approach and embracing a broader perspective helped clarify the purpose of all the concepts. One of the initial challenges was deciding to focus on sidewalks, which are integral to the transportation infrastructure. Numerous organizations contribute to the formation of sidewalks, and various factors influence their design. Pedestrians hold diverse opinions and experiences, yet there are underlying patterns and dynamics that can be observed and harnessed to enhance quality.

To tackle research, the adoption of systems thinking was deemed necessary, as it offered a promising approach to address the complexities of such systems. The systemic design toolkit (Jones & Ael, 2021), used for analysis, profoundly incorporated research inputs. Feedback sessions played a vital role in framing the problem, conducting reasoning, and defining the solution space. Visual aids, such as drawings and diagrams, proved valuable in understanding the sequence of events. Some models were used to gain insights into the themes and the underlying processes. For instance, an adapted iceberg model provided a helpful framework to grasp the broader contexts at play.

One tool that had a significant impact on the outcomes, was studying relations. These were created to define the dynamics between factors, and they became an integral part of the project's models and tools. They were employed throughout the research, analysis, and solution space, with the aim of stimulating thoughts and connections "in between." While some models were more refined than others, each of them played a crucial role in understanding sidewalks.

Incorporating relations between factors raised various questions and conflicts within the system. For instance, the lack of feedback regarding positive experiences from walking and the reliance on complaints as a basis for change making. This approach was found to be exclusionary and prompted a reassessment of whether pedestrians' perspectives could be involved.

It can be argued that every city, is a unique and complex environment, requiring diverse solutions. Similarly, the methods used in the system analysis have to be adapted to suit the specific context. It seems important to avoid adherence to a single model, as that can create a barrier to understanding. Instead, the combinations and adaptations allowed for a more comprehensive view. One model that proved particularly useful was the division of research into micro, meso, and macro scales. It facilitated the organization of desktop research, and also helped identify the actors influencing sidewalks.

By embracing a systemic design approach, this project sought to engage stakeholders in meaningful ways. However, feedback loops and understanding at the organizational level proved to be a challenge, possibly due to the lack of effective communcation mechanisms. There is a need to establish how to distribute input from various stakeholders, including those who are not currently part of the organization.

The process of developing solutions was exciting, considering the multitude of options available at different levels of the system. However, the time spent on understanding systems affected the ability to refine the concepts in detail. As a result, solutions exclude user testing, active participation and feedback from more than one stakeholder involved in sidewalk existence. Despite these limitations, the process in form of combination of methods turned out to be the most engaging outcome.

Trying out different tools was an engaging journey. An interesting addition to what has been done would be to further develop some of them. For instance, to incorporate concepts into an iceberg model. By doing so, it would provide clarity on how these concepts manifest as tangible events on the streets and shed light on the socio-economic trends that could be influenced by their integration into the system. Moreover, it offers an opportunity to shape the paradigms that exist thoughout society.

As a result, four concepts were designed to address different areas within the system. One of the most challenging aspects was to imagine their relationship to the future walkability program of Oslo. To address this, a system of titles was created that directly associates Oslo with the interventions, such as "Oslo, an attractive city" or "Oslo, a city designed for people." This helped to clarify the city's role as a listening, caring, and responsive organization, emphasizing its contribution to common good.

Reflecting upon the learning process, it became evident that the mental activation occurred during the time spent in Barcelona. It served as a catalyst for seeking the unseen and expanding knowledge (Romesin & Bunnell, 1999). Reading diverse sources from different contexts and cultures posed a significant challenge. However, it became apparent that patterns of quality exist in the dynamics of streets, albeit in various forms across different countries.

From the perspective of a design student, this project was a great opportunity for seeking insights from other disciplines such as philosophy, engineering, psychology, sociology, and design. It highlighted the need for the presence of multidisciplinarity in complex projects. Discussions with The Agency for Urban Environment were instrumental in clarifying facts and understanding the system's relationships.

However, due to the challenging process of building a network for the project, this feedback came relatively late in the process. If this information had been available earlier, there would have been an opportunity to test some of the concepts. Discussions with the organization provided a clearer understanding of the problems that needed to be solved, but it also made it challenging to navigate the development of concepts for a student as an individual. As a result, the project's outcomes are a combination of both inputs.

The role of the student was to address uncommon topics, as they are crucial for tackling future challenges. Systems thinking played a vital role in gaining a broader perspective and understanding ordinary problems from different angles. The Master's program in Design in Complexity provided guidance in developing systems thinking skills. However, communicating these ideas to institutions can be challenging. Studying complexity opens doors to engage with different disciplines, understand their viewpoints, and effectively convey the messags between each other. In systemic design, the designer engages this communication. Acquiring new methods and exploring adaptation proves to be key factors for success. The ultimate aspiration is that one day we can "see".

8 CONCLUSION

The project outcome is a strategy comprising four concepts. It is a manual that guides the transformation of Oslo's environment, shaping and communicating its future, utilizing existing or upcoming elements around sidewalks. These concepts operate at different scales while supporting one another. The solution space chapter details the process of establishing future goals, involving citizens in defining quality in public spaces, exemplifying the application of a specific quality within a context, and addressing challenges in understanding citizens and their perception of everyday events. Furthermore, the research conducted for this project can serve as a package of knowledge that gather relevant information about sidewalks. A gigamap (Sevaldson, 2022) serves as a visual presentation of the project.

Can systems thinking revolutionize sidewalk design? Indeed, it can. The more respectful the study, the more thought-provoking questions it raises, which is a positive starting point. Systems thinking aims to comprehend and question dynamics of reality. In this project, it involved exploring the potential of sidewalks, especially those lacking distinctive contextual qualities. The project suggests the need for change. Introducing diverse contexts along the paths we walk can enhance our interest in and experience of walking. Therefore, systems thinking holds promise in influencing what sidewalks produce. By prioritizing comfort and attractiveness, which are currently someway absent on sidewalks, the dynamics can be transformed (Personal communication, May 2023).

Methorst's detailed research on walking serves as an initial step in understanding (Methorst, 2021). Gehl advocates for shaping cities that prioritize human scale (Gehl, 2010). Concept A illustrates this approach. Gehl explains how intuition influences behavior on streets and how observations can elucidate these patterns. This could be valuable for data collection. It has been observed that qualities that enhance the enjoyment of walking are lacking on sidewalks (Methorst, 2021). While these qualities are recommended in theory, their underlying reasons are not addressed. As individuals are capable of identifying these qualities, they should be given the opportunity to participate. The challenge lies in actively involving the target user group in the city-building process, which is addressed by Concept B. Through participation campaigns, new communication channels can be established between people and the city.

Furthermore, the context surrounding sidewalks plays a significant role, offering options, impressions, and evoking emotions in people. As an example, Concept C suggests activating the presence of nature on sidewalks. The weather in Oslo also contributes to this context, although it is an element that can hardly be changed. Concept D aims to challenge people's perceptions and thoughts regarding weather, involving the municipality in taking actions to address fears or irritations that it causes. It is believed, that by addressing these emotions, attitudes can be shifted positively. To understand citizens better in the future, it would be valuable to examine their social and economic backgrounds. Understanding who walks and the factors that motivate them would help to identify the socio-economic trends that shape pedestrian behavior and determine their desires and needs.

However, further investigation is required to understand the organizational processes involved. The developed flowchart for the investment regime may pose challenges in implementing short-term interventions in public spaces. It seem demotivating for employees to participate in projects where the timeline from workshops to implementation has no end. Hence, it is crucial for the objectives of the disciplines involved in shaping sidewalks to be in alignment. Clarification of common goals, and testing processes on a smaller scale, can provide valuable insights.

The goal of this project is to redefine what is considered ordinary. Sidewalks, being a common element in urban environments, are often overlooked. This project addresses the complexity of factors that contribute to the lack of comprehension for pedestrian and proposes that a systems-oriented design approach can be beneficial for municipalities. While this applies not only to Oslo but also to other cities, starting with the capital city sets a strong foundation for pursuing sustainability at a national level.

Shaping the urban environment for the future involves the need to sustain society. Vallance emphasizes the importance of acknowledging the complexities of social dimensions (Vallance et al., 2011). In the collective work, they argue that social scientists should actively contribute to assessing the experiences of the spaces in which people live.

Concepts align with three main sustainable development goals shown on Figure 79 (United Nations, 2023). The objective is to create inclusive, safe, resilient, and sustainable citiy and human settlement, which corresponds to Goal 11. Sidewalks should be inclusive and cater to the needs of all individuals. As communication platforms, sidewalks have the potential to connect various rural areas and environments, acting as conduits for quality experiences throughout the city. This advantage should be leveraged.

The next goal is to establish a resilient infrastructure, which corresponds to Goal 9. Promoting walking can help reduce air pollution generated by cities, contributing to a more resilient and sustainable urban environment.

Lastly, targeting goal 3, the concepts initiate discussions on how to ensure well-being for people living in cities. This can be done by creating environments that provide quality experiences, and by building the bond between those who provide care and those who benefit from it.

Figure 78 - Targeted sustainable development goals.

Therefore, with a focus on prioritizing pedestrians and providing extra care, Oslo has the potential to transform into a city designed for its people. By listening to the needs and preferences of individuals who walk, we can create a city that truly works for them.

Empowering people to have a say in the design of their city is crucial. Common practices in systemic design have shown that the most productive outcomes emerge from physical sessions and workshops. Therefore, facilitating the participation of people and incorporating their direct goals through collaborative sessions can be an advantage for municipalities.

Oslo has the opportunity to become an attractive city, not just for visitors but primarily for its residents. By considering the desires and experiences of citizens, an appealing environment can be formed.

Lastly, Oslo can be a caring city by actively addressing the issues faced by its residents and fostering communication.

As you reach the end of this project, take a moment to reflect on the path you have walked to get here. If you have fond memories of that journey, consider yourself fortunate. If you have difficulties to remember, this project is a starting point for change.

Figure 79 - "Sidewalk in Oslo, that offers more than just walking" - AI generated image (Midjourney)

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