What could a feminist mobility system look like?

A reflection on the role feminist design can play within radical sustainability transitions

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ABSTRACT

As part of the Sustainable Design Engineering field, the aim of this thesis is to reflect on what could a feminist mobility system look like. In order to do so, it explores the potential for the emerging field of Feminist Design to come together with the tradition on Sustainable Transitions to bring about a more sustainable mobility system. Women's current more sustainable practices are explored from a Practice Theory perspective in an effort to understand the meaning and values they ascribe to the practice, and how could those be adopted by a wider population. The whole project is inscribed within a Participatory Design approach, involving stakeholders in the process of creating possible solutions.

Keywords

Sustainability; Mobility; Feminism; Sustainable Mobility; Practice Theory; Participatory Design; Feminist Design

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This period has been a time of growth, and I would like to personally blame all of you for it.

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0. Introduction

The reality of the climate emergency humanity is living and the fact that action needs to be taken to solve it are becoming more and more critical. If a better and brighter future is to be reached, it is of the outmost importance that more sustainable planning, infrastructures, policies, programs and institutions are put into place. These interventions need to have an effect in sustainability at all levels, and to do so, must have a long-lasting impact in people's practices. This project approaches these issues from a gender perspective, looking to explore the role that feminism can play within sustainability when moving forward.

As an essential part of people's lives, the current transport and mobility paradigm´s toll on the environment is not something to be disregarded. It is after all responsible – along with housing – of generating most of the carbon dioxide emissions (IPPC, 2008), if both road transport and urban mobility are taken into account. And that is only the toll transport and mobility take on the environment. A new paradigm is therefore needed, one that advocates for walking, cycling and using public transport in cities and disregards the idea of a car-centric society.

This alternative version of the future that focus on active travel would not only reduce fossil fuel consumption and carbon emissions – along with the consequences of those, such as traffic congestion as well as air and noise pollution (Woodcock et al., 2007) – it would also improve people's health (Woodcock et al., 2013) while promoting a more equal an egalitarian society. To do so, the sustainable transition to take place must not only be concerned with the environmental dimension – it needs to consider the way in which social sustainability and its final goal of equity influence the future system.

Why is it then that this project aims for a feminist mobility system and not a sustainable one? Turns out, both may come hand in hand. The fact that gender and mobility, as well as how important they are to each other in terms of equality and accessibility has already been extensively covered by feminist theory. The world as we know it nowadays, and the way people are encouraged to move around it in their everyday lives, has been planned and designed in such a manner that only the needs of approximately half the population – at best – are accounted for: men's. This bias is not necessarily intentional, and relates to the fact that there is a historical vast gender-disaggregated data gap that has conveniently ignored the fact that women's bodies inhabit and transit the same spaces men's do. As a result of this knowledge void, 'gender neutral' and 'for all' approaches have failed to achieve the universality they set out for, catering instead to the so-called 'default male'.

How to get rid of this conditioning when moving forward, one may ask? Looking for the answer to this question, this project resorts to one of the most relevant recent bodies of work that reflects on how this imbalance affects people's lives, and in its author's own words, sometimes "all people needed to do was to ask women" (Criado Pérez, 2019).

In the context of mobility and transport and when trying to analyze and understand mobility patterns, gender is an essential variable. With the raising interest in sustainable mobility, questions about the way in which gender ties to mobility have been brought to the forefront, and so literature on gender and transport is a growing body of work concerned with the meanings attached to it.

Existing research regarding transport and mobility shows that "women's travel looks more like sustainable mobility than does men's travel" (Hanson, 2010, p. 14). Women tend to walk more, use public transport – especially buses – more and they travel more in cars as passengers – which ties into the car being shared when used. Moreover, they tend to trip chain – make multiple stops along the same trip – and travel shorter distances (Rambøll, 2021). Although the reasons as to why this happens are very context and location dependent, one of the main ones is due to the fact that women usually deal with most of the unpaid work and the care work at home.

The aim of this thesis is to study the way women move around as well as their motivations and reasons to do so and figure out how to build new mobility identities and a more inclusive and sustainable mobility based on those. It intends to propose an alternative to the current socio-technical transportation and mobility system from a sustainable transition perspective, taking into account the role that gender and gender roles play within it, in such a way that both the sustainability and the feminism agendas are moved forward. To do so, it will answer the research question: how could a feminist mobility system look like?

The project's foundation is a state of the art about the link between gender and mobility, as well as a literature review regarding previous research on the role that gender plays to develop new methodologies of design. Relying on participatory design strategies, interviews with both experts in the field and participatory design workshops have been conducted to delve into the whats and the hows and the whys of current practices. Through the use of design games and scenarios, alternative practices and the system within which they can exist and thrive were explored.

0.1. REPORT STRUCTURE

This report aims to answer the research question through to the following structure:

The remainder of Chapter 0 presents the delimitation of the project, both regarding the context within which it takes place and the terminology used throughout its execution. Chapter 1 lays out the theoretical framework and the methodology used in the project. Chapter 2 presents the initial literature review and the conclusions that led to the research question. Chapter 3 outlines the empirical work carried out throughout the project, including expert interviews, participatory workshops and the mapping of practices. Chapter 4 concludes on the thesis, including a discussion on the project and its limitations and a reflection on what its contribution to the field of Sustainable Design Engineering is, along with the final conclusion and potential next steps and ways of moving forward within this field of research and intervention.

0.2. CONTEXT

As mentioned earlier on this chapter, there is a knowledge gap in the role gender plays within transport and mobility, and despite its image as a 'leader' in equality (McKinsey & Company and Innovation Fund Denmark, 2018), Denmark is no exception – the country recently ranked 14 out of 153 countries in a recent report in gender equality (Forum, 2019), remarkably low compared to the rest of the Nordics, which hold the first four positions.

This thesis aims to fill this gap – or at least part of it – in a Danish context, focusing on creating a vision within Copenhagen municipality. Hanson (2010) states in her research on gender and mobility, that for any research or intervention to make sense, analyze the pertinent elements and propose relevant solutions, it needs to be tailored to a specific culture of mobility in a local context. Copenhagen, and by extension Denmark, was considered an enabling environment to perform a sociotechnical environment on the topic, especially for a couple of reasons.

Firstly, Denmark is – together with the Netherlands and Germany – of the main high-cycling countries in Europe, with 45% of bike trips done by women (Pucher & Buehler, 2008), which probably entails a higher willingness to engage with means of transportation alternative to the car-centric narrative. Finally, another interesting aspect about implementing a gender perspective in the mobility system in Denmark is the fact that gender is not really taken into account when urban planning processes take place, as the acknowledgment of possible inequalities can be perceived as an attack to the idea of the welfare state and Danish identity (Freudendal-Pedersen, 2013).

0.3. TERMINOLOGY

Before moving forward, the understanding of the terminology that will be used in this thesis will be characterized and reflected upon in this section.

Although the terms transport and mobility have been used somewhat interchangeably throughout the introduction, the project makes a distinction between the two, and focuses on mobility from now own.

When looking at the dictionary, transport is defined as "the action of carrying or conveying a thing or person from one place to another" while mobility is defined as "the ability to move or to be moved; capacity for movement or change of place" (Oxford English Dictionary, 2021) or as not "just having access to one mode of transportation. Mobility is having transportation options, and the quality of those options" (Fortunati, 2018). In other words: transportation is something you do and mobility is something you have, and so the difference between the two is the difference in a focus on equity and access. The understanding of the concept of mobility in this thesis comes from the New Mobilities Paradigm – also known as the Mobilities Turn –, which studies the movement of people, things and ideas and its implications in society as an integrated approach at all (Bissell & Fuller, 2013; Cresswell, 2006).

Within this paradigm, Sheller (2011) makes a critique of 'old' mobilities as "grounded in masculine subjectivities, made assumptions about freedom of movement and ignored the gendered production of space" (Sheller, 2011, p. 3), while the New Mobilities paradigm "suggests a set of questions, theories,

and methodologies rather than a totalizing description of the contemporary world" (Sheller & Urry, 2006, p. 210).

Since this thesis is involved in pushing the social sustainability agenda forward, its main concern is with mobility – and mobilities – as a way for people to gain access to services or goods, destinations and activities, and from now on that will be the main term used in the text. This access is not oversimplified as just the journey to work and back – it also considers movement done for social, care and sustenance purposes, which do not necessarily need to be subject to an economical compensation.

As our understanding of gender grows by the day, it becomes more complex to define it with enough nuance in just a few lines. A superficial approach would be to talk about gender as the differences that are perceived between men and women and the inequality in power relations between them (Scott, 1986), but this description fails to recognize the link between gender and the sociocultural context that conditions its definition, as well as the meanings and practices that are associated with these presumed differences based on the concept of biological sex. Andrea Nightingale (2006, p. 171) defines gender as "the process through which differences based on presumed biological sex are defined, imagined, and become significant in specific contexts". It is essential, then, to have a clear picture of the geographical, cultural and social context in order to understand the meanings and practices of gender.

With that in mind, this thesis deals with gender as a social construct – a required post-structural approach since, if gender roles are to be subverted they need to be able to shift and change in the first place – while also acknowledging that the mainstream understanding of gender is biologically determined – a notion that needs to be addressed and challenged.

Finally, when talking about sustainable mobility this text builds upon the Six Transformations (Sachs et al., 2019) framework. Within it, Transformation 5 is concerned with 'Transport', 'Urban Development' and 'Water and sanitation', and encapsulates the Sustainable Development Goals (United Nations, 2017) intervention related to 'Sustainable mobility and transport networks'. Public transport systems and ride-sharing are included in this transformation, that advocates for participatory and inclusive urban planning to develop infrastructure that ensures the long-term sustainability of mobility and accounts for the rising population – "cities require competent and adequately resourced local authorities that can pursue integrated strategies and ensure participatory design" (Sachs et al., 2019, p. 810).

Sustainable mobility would therefore be one that is universal, efficient, safe and green, one that lowers the current levels of emissions and consumption of non-renewable resources while at the same time being accessible for all, fostering greater equity.

1. Design Process

In this section, the theories and methodologies that have been actively used throughout the project and the report will be explored and introduced. It aims to familiarize the reader with these concepts to better understand this thesis as well as its outcome.

1.1. THEORETICAL FRAMEWORK

In order to be able to analyse and make meaning of the collected data in any research project in a consistent manner, a theoretical framework needs to be in place first. Although there are many definitions for what a theory and what a theoretical framework should be and the relationship between the two, this thesis builds upon the assertion that "The theoretical framework is the structure that can hold or support a theory of a research study" (Swanson, 2013, p. 122) and therefore needs to structure and summarize the concepts and theories the research will expand from. It will support the project in the analysis of the data, as well as the discussion and reflection of the findings (Kivunja, 2018).

And so, in this section, the main theories that constitute the theoretical framework of the thesis are going to be laid out. This chapter will not only be concerned with concepts introduced throughout the Sustainable Design Engineering Master's Program at Aalborg University, but will also delve into other theories that proved to be relevant for this thesis, and have shaped both the understanding of the topic at hand and the outcome of the project.

It is important to acknowledge that while these were the overarching theories chosen in this specific approach to the subject at hand, the thesis does not intend to put them forward as neither necessarily the singular nor the finest means to challenge the current understanding of mobility and urban planning. However, the point of departure of this thesis – and the reason why Practice Theory has relevance in this context – is that an exclusive focus on individual behaviour – a typical approach in transportation – would fail to create a holistic understanding of the current situation and the different connections and overlaps between practices, and therefore would not achieve the final goal of bringing about radical systemic change. By looking at the practices, this thesis aims to tackle the problem from a mobility perspective and understand the reasons behind people's behaviours in order to facilitate a better – and easier – transition to sustainability.

1.1.1. Sociotechnical Sustainable Transitions

This thesis takes as a point of departure the understanding that the current socio-ecological challenges humanity and the world are facing in our time will not be solved through incremental steps, technological solutions or by placing responsibility – and blame – on individual people to make a change Loorbach (2016). Raising temperatures and uncertain climate, loss of diversity, depletion of resources or ever-growing inequalities – among

many others – need to be tackled from the perspective of what has come to be defined as Sustainable Transitions.

The field of Sustainable Transitions is concerned with radical and structural changes in the way societies function and their governance – as well as the production and consumption patterns that exist within – (Köhler et al., 2019; Loorbach, 2010), considering societies as complex socio-technical systems – that is, systems in which physical objects and technologies (the technical) are intrinsically linked to habits, expectations and relations (the social) (Smith et al., 2005). A strong systemic approach and the acknowledgement that sustainability will not be reached by coming up with more sustainable products or services, but rather through interventions that reshape the systems they are inscribed in (Gaziulusoy & Öztekin, 2019).

These interventions need to be creative and transdisciplinary and take into account the complexity of the context they come to be in. The transition progress requires some degree of social acceptance to be successful and needs to anticipate and avoid possible rebound effects that might lead to the reinforcement or new creation of injustices (Köhler et al., 2019), which is where Design for Sustainable Transitions comes into play.

By integrating Sustainable Transition theory with the theories and methodologies of Design, Sustainable Design Engineering seeks to bring forth alternative socio-technical systems, explore how can design be used to transition into them and define the role the figure of the designer plays in this transition (Gaziulusoy & Öztekin, 2019). With this goal in mind, Gaziulusoy and Ryan (2017) call for the generation of three types of knowledge. Systems knowledge – looking at the present to understand what needs changing –, target knowledge – coming up with a proposal for the desirable future systems – and transformation knowledge – bridging the gap between the present system and the future system – (Pohl & Hirsch Hadorn, 2007).

For design processes to be able to successfully enable systemic transitions, they must fulfil a series of criteria that shifts the focus to elements often overlooked in existing solutions. As specified by Gaziulusoy (2015), those are a strong sustainability model, radical innovation, the adoption of long-term perspectives, and the enablement of changes in mindsets.

Finally, and for the sake of later comparison, this thesis introduces a framework for innovation within Design for Sustainability crafted by Ceschin and Gaziulusoy (2019), in which the aim was to integrate in a coherent manner multiple Design for Sustainability approaches and to understand the evolution of the field over the past decades.

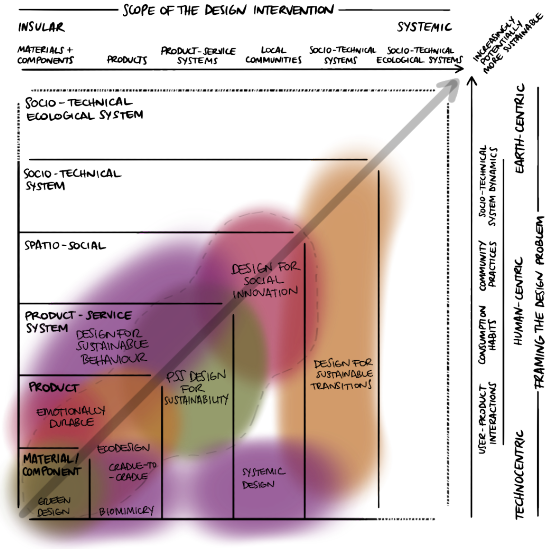


Figure 01.
Design for Sustainability innovation framework (Ceschin and Gaziulusoy, 2019)

1.1.2. Practice Theory

Practice Theory has been used alongside Sustainable Transitions and Feminist Design as the carrying theoretical approach in this thesis. It is not a theory in and of itself, but rather a family of theories that share similarities in their conceptual framework. It understands social behaviour as the interconnection of collective actions or as a collection of recurring routines that maintain social structures (Shove et al., 2012). A practice is therefore understood as the interactions between three elements linked in and through performance – materials, meanings and competences. These interactions are essential to understanding practices and how they change, and give shape to the practice triangle shown below. Practices are then shaped by a structure of meanings reproduced by the individual that are prescribed into a material, with which said individual interacts through a set of competences.

Figure 02. Elements of Practice Theory (Shove et al., 2012)

All three elements are present whenever a practice is performed, influencing and shaping each other, and are indeed essential for a practice to take s¬hape. It is also important to note that practices do not exist in isolation, but rather build upon one another, and so within a practice, other different practices can be embedded, creating a complex network of practices and actors. These interrelations need to be accounted for and untangled beforehand if practices are to be influenced and, ultimately, changed.

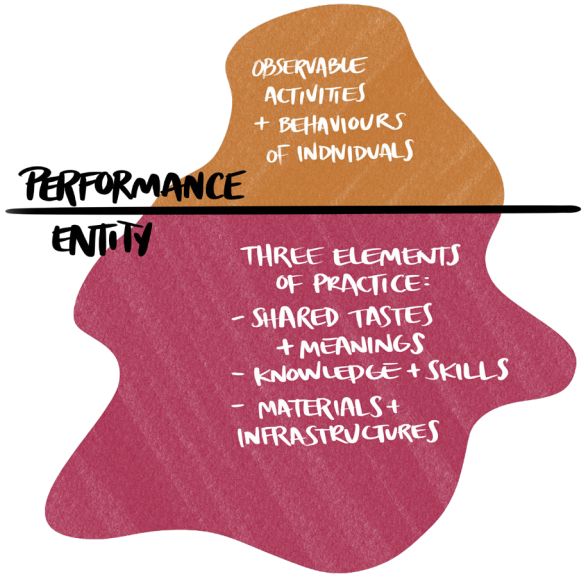


Figure 03. Practice as a Performance/Entity (Schatzki, 1996)

Another aspect of Practice Theory to consider – although it is not something this thesis explores in depth – is Schatzki's (1996) distinction between practice-as-performance – understood as the individual's behaviour that can be observed – and practice-as-entity – related to knowledge, skill, materials, infrastructure, socially shared tastes and meanings.

Practices as entities can exist even if they are not being performed, but it is during the performance of the practice itself that the elements that give it shape interact, bringing the practice to life.

As a central theoretical framework in the thesis, and on the basis of "understanding the dynamics of practices offers us a window intro transitions towards sustainability" (Spurling et al., 2013, p. 4), Practice Theory has been implemented in order to understand the current mobility system and the way people behave within it, as well as to map and identify relevant values for the future feminist sustainable future the project aims to move towards.

1.1.3. Feminist Design

For the last of the core theories, it is following the guidelines for Feminist Design Methodology as described by Baker (2018) that this thesis has been developed. As previously stated in the introduction – and as it will be elaborated upon in the next section of the report – there is a link between gender and mobility, that will be explored in this thesis to analyse its potential to create more sustainable future practices. Because of this, it has been decided to research the principles of Feminist Design to ensure that the gender perspective is part of the core of the project.

Although a methodology in essence, as the name of the article "Post-work Futures and Full Automation: Towards a Feminist Design Methodology" presents, its description and the insights taken from it are included in the Theoretical Framework section of this report due to the fact that this thesis directly builds upon a feminist approach to inform both the research and the design processes.

Although at a glance not directly related to Sustainability or Mobility – as is the context of this thesis –, the text reflects on the current limitations of existing approaches to design, relying on the argument that Daniela K. Rosner (2018) presents that "design thinking methods reproduce many of the individualist, solutionist, objectivist and universalist tendencies of twentieth-century design practice", and stating that "as a discipline, design has been often complicit in the spread of Eurocentric and patriarchal ideals" (Baker, 2018, p. 4) and draws from the premise that design methodologies are the way that the role that designers play in perpetuating gender inequality manifests.

Figure 04. Demands for a Feminist Design Methodology (Baker, 2018)

After presenting a variety of feminist theory approaches and emergent design practices – among which transition design can be found – Baker concludes that the understanding of user-as-consumer is obsolete, and that design methodologies require an ontological reorientation that goes beyond it. The foundation of a Feminist Design methodology inspired by this new perspective is then laid out by the author, given shape a series of demands that range from aiming to challenge inequality through design, holding to the notion of the feminist utopia, exploring social reproduction as a site of systemic change, combining participatory methods with techniques to encourage critical awareness, using a concept of technology that does not just involve the new or the digital, experimenting with non-linear concepts of time, to finally involving and ethics of care that goes beyond empathy as a means to a market.

Such demands have therefore been taken as overarching guidelines when approaching design in this project, merging them with the rest of the Sustainable Design methodologies brought into play and building upon the resulting combination.

1.2. DESIGN METHODOLOGY

There is no complete or cohesive definition of design to be found nowadays, as both the concept and the profession of the designer change as rapidly as the world surrounding them. However, it can be said that design is a tool that allows involvement and engagement with the surrounding environment and the exploration of possibilities to improve it. In short, design is used to make sense of the world.

As Laursen and Haase (2019) state when looking at the work of Rittel and Webber (1973), "design practice is significantly different from rational problem solving, since it involves the solving of a wicked problem" (Laursen & Haase, 2019, p. 815). Wicked problems are ill-defined, and do not have a 'solution' but rather a 'resolution' since "social problems are never solved. At best they are only re-solved – over and over again" (Rittel & Webber, 1973, p. 160). Taking the mobility system, which is already a complex enough system on its own, and aiming to make it more sustainable while looking at the process through feminist lenses can definitely be considered a wicked problem, and one where the social aspect the definition highlights plays a crucial role.

In the following section of this chapter, the different methods used in the development of the thesis in order to gain and produce knowledge will be laid out. As it is the case with some of the concepts presented in the previous section, the methodologies outlined in the following paragraphs have been introduced or used throughout the Sustainable Design Engineering Master, and therefore deemed relevant and valuable to be used in this thesis. In doing so, the project aims to go further than a traditional research project would and come up with a resolution for the wicked problem it has been presented with, paving a path that goes beyond just academic results and brings about radical change rooted in research and design practices.

1.2.1. Participatory Design

The relevance and the need of involving different actors in design processes have brought about changes in the design process and the role the designer plays within it. As one of these new conceptions of design, Participatory Design consolidated as a practice in Scandinavia in the 1970s as part of the workplace democratic movement (Robertson & Simonsen, 2012). Even though its user involvement characteristics have seen it classified as merely a design approach, the presence of an elaborate methodological orientation – along with methods and theories – supports the argument that Participatory Design is research (Spinuzzi, 2005). Participatory Design aims to involve pertinent stakeholders in the process of creation, recognising that they hold tacit knowledge relevant to the design process. The core of participatory design brings attention to the ethical stand that "people should be involved in the design of the (technological) futures that they want to inhabit" (Baker, 2018, p. 544).

Sustainable solutions have so far been developed by an elite of experts and selected stakeholders, without considering the general public. In the context of sustainable transitions, there have been calls to address this issue and implement approaches that broaden the horizon from the traditional scientific disciplines and bring other types of knowledge cultures to the forefront – involving practice-based, tacit and lay knowledge (Bizikova et al., 2015; Miller et al., 2011; Robinson, 2004).

According to Garduño García and Gaziulusoy (2021), co-creative approaches to transition knowledge generation are essential because of three main reasons: to depict the existing plurality and facilitate negotiation of values between different actors, to defy the vested interests of the current power structures that slow down transitions, and to encourage participatory deliberation that will create wider ownership of the transition progress, accelerating it.

1.2.2. Double Diamond

The process followed for this thesis adheres to the Double Diamond model as understood within the Design Thinking framework. Design Thinking is a problem-oriented approach to design work, which is also aligned with Aalborg University's Problem-Based Learning and project work – this approach has been internationally recognised, draws from the idea that people learn best when applying theory and research-based knowledge, and builds upon collaboration through self-governed group work based on authentic problems.

Design Thinking started as a human-centred approach to innovation that built upon the designer's way of thinking and working, and its main principles are understanding people and creating alternative answers, redefining obstacles through a solution-based methodology (Carlgren et al., 2016). As stated before, the Double Diamond is the model that has been chosen for the development of this project, but it is relevant to state that many other different methodologies can be used to implement Design Thinking.

This thesis, as many design projects do – since no design is ever truly finished –, has followed an iterative process that has called for a constant re-defining of the design through trial and error, so that it can be accommodated within a fluctuating environment.

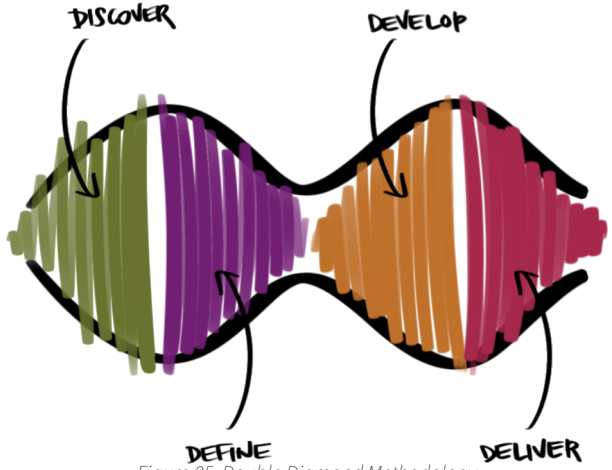


Figure 05. Double Diamond Methodology (Carlgren et al., 2016)

The traditional Double Diamond model is divided into four different phases that alternate between being problem-oriented and solution-oriented, and as illustrated in Figure 05 it starts diverging or opening up the process to then converge or narrow down again. The first phase, Discover, broadens the project's perspective through research, looking to explore different possibilities and trying to gather information to be able to Define the problem to be tackled. In this second phase, all of the knowledge gathered so far is narrowed down into a specific problem area, a process also known as 'problem definition'. After this, comes a second divergence phase, in which the aim is to explore and Develop possible solutions to the problem that has been defined. Finally, a final solution is detailed and ready to Deliver in the last phase.

Even though it is often illustrated as a linear process, with a clear start and an ending point, the Double Diamond approach is inherently iterative, and in each cycle previous assumptions might be disproven or modified by new findings, changing the course of the project. Such is the case in this thesis, and therefore the result is an outcome of multiple iterations.

1.2.3. Semi-structured Interviews

Semi-structured Interviews are based on open-ended questions that facilitate discussions related to the main topic of the interview while allowing divergence into themes that otherwise might have not been touched upon. In using this way of engaging with actors – in this thesis' case, experts in different topics related to the main theme – two main objectives are strived for: avoiding imposing meaning that might lead the interview in a specific non-desired way, and creating a relaxed conversation in which side-tracks allow to touch upon ideas that otherwise might have been not considered, but could still be relevant (Zorn, 2008). This type of interviews is mainly used when the researcher is not going in blind into a topic, but rather, they are trying to get a qualitative insight that would complement previous findings while still being open to exploring other issues.

In the words of Galletta and Cross (2013), Semi-structured Interviews are "a repertoire of possibilities", that enables creating a bigger picture by making different, broader dynamics visible. It is, in essence, a collaborative process between the interviewer and the interviewee, and therefore central to the development of this thesis.

1.2.4. Boundary Objects

Understanding objects as a collection of artefacts that individuals work with, a boundary object can be understood as a "shared and shareable" (Carlile, 2002, p. 451) object that is used to "find ways to communicate across cultural boundaries" (Schein, 1996, p. 19) and that functions across different practices and or functional settings. Boundary objects allow the negotiation and transfer of knowledge within a particular system through a given boundary by establishing an in-between infrastructure between actors, avoiding potential miscommunications.

For a boundary object to be effective, it must establish "a shared syntax or language for individuals to represent their knowledge" (Carlile, 2002, p. 451), provide "a concrete means for individuals to specify and learn about their differences and dependencies across a given boundary" (Carlile, 2002, p. 452) and facilitate "a process where individuals can jointly transform their knowledge" (Carlile, 2002, p. 452).

1.2.5. Future Scenarios

As descriptions of specific use of a design solution contextualized within a relevant setting, Scenarios can act as communication of a short narrative that helps the actors visualize it in a more concrete manner (Anggreeni & van der Voort, 2008; Iacucci & Kuutti, 2002), providing a "more qualitative description of how the present will evolve into the future" (Stojanovic et al., 2014, p. 84). It is a useful tool that allows the exploration of multiple futures and how to get to them, as well as their technicalities and logistics.

By being consistent and built upon educated guesses, Scenarios gain credibility and launch conversations in which a diversity of perspectives will most likely spawn different alternatives and strategies to move forward (Gaziulusoy & Ryan, 2017; Milestad et al., 2014). This exposure to different viewpoints and mindsets can stimulate learning and collective action through the process of enabling understanding of complex sociotechnical systems (Johnson et al., 2012) – as is the case of a city's mobility system.

The concept as introduced by Callon (1987) – a Scenario being a process that guides actors to support the future by assigning them roles in the transition that will lead to it– also emphasizes through what he calls 'sociology of expectations' that scenarios can draw the attention of relevant actors and therefore contribute to the realization of relevant socio-technical solutions.

Figures 06 + 07. Example of the visualization of scenarios used during the workshops.

In the context of this project, Scenarios are used to create the vision of a certain probable future in the minds of the participants involved in the context of several workshops to co-design a future mobility system. Building upon the previously described participatory approach, they were used to compare the different outcomes depending on the composition of the participants. However, the participants themselves also create a Scenario as part of the workshop – prompted by deliberate blanks in the original scenario that they need to fill through the worldbuilding of this future. Therefore, the exchange of knowledge and aligning of perspectives and understandings motivated in the participants enables the creation of new knowledge, along with raising awareness about this potential future, the new issues that may be encountered in it, and the differences and similarities it has with the present.

1.2.6. Personas

Ever since the concept came to be, there have been various definitions of the concept of 'persona', the most widespread one being related to a persona as a fictional character that aims to be a representation of a specific target user (Pruitt & Adlin, 2006). If we look back at its origin and according to Cooper (2008), personas are defined not as real people, but as a representation of these in the design process.

These personas come to be as a by-product of the design process and contribute to helping designers see beyond their own assumptions, representing real users. In the context of this project, this tool has been slightly modified, since it is not the designer that uses it, but the stakeholders involved in the participatory design process.

1.2.7. Design Games

Design Games are tools for actor involvement and co-design that "highlight the exploratory, imaginative, dialogical and empathic aspects of codesign" (Vaajakallio, 2012, p. 217). A Design Game can take many different shapes and forms, and so produce as many different results supporting idea generation, collaboration and interplay. However, what they share is the use of game-like elements, such as 'turns', 'tokens', 'boards' or 'game cards', generating a temporary, more creative setting for the participants to co-create. In the context of this project, it will be used as an intermediary object.

Certain elements of Design Games make them remarkable tools for participatory interventions, as described by Vaajakallio & Mattelmäki (2014). First, they create a common design language, which helps ground the participants and make sense of objects and relations within an established shared framework, prompting co-discovery. Design Games also seek to promote a creative and explorative attitude, supporting dialogue between the participants, and facilitating that they envision and enact 'what could be'. Finally, the game would help define the roles of the participants in the process.

Some of these features overlap with the ones presented by Brandt et al. (2008), which were also taken into account in the process. Such features are led by the game being a collaborative activity that gathers a diverse group of players, guided by a set of simple and explicit rules and assigned roles supported by pre-defined gaming materials that can point to both existing practices and future possibilities. According to Vaajakallio (2012), these materials can work as a visual stimulus for exploring alternatives, a boundary object or a visual reference for the shared focus of attention; they can also work as documentation, reminder and illustration of the progress; or, finally, as a visual indicator of being within a game world performing roles appointed by the game. Going back to the features that encompass a Design Game as defined by Brandt et al., the game should be played within a confined and shared temporal and spatial setting, and should seek to establish and explore novel configurations of the game materials and the practices pointed at. Finally, there should be a final representation of a possible design as a result of the game.

2. Literature Review + State of the Art

In this chapter, the goal is to review recent research done on the chosen topic in order to create an overview of the current state of the area of investigation, along with an informed grasp of the problematizations engaged in so far – understanding their methodological and conceptual considerations, along with their limitations – and finally, identify crucial areas for further exploration. As Snyder stated, "an effective and well conducted review as a research method creates a firm foundation for advancing knowledge and facilitating theory development" (Snyder, 2019, p. 333). Hart's framework in Doing a Literature Review: Releasing the Social Science Research Imagination (1998) was followed when conducting this review to identify the key sources and discussions on the topic.

To do so, traditional desk research concerned with the existing publications so far has been conducted, collecting relevant material that was used to structure the work in the project. Through Elsevier's abstract and citation database, Scopus – chosen because of its peer-reviewed nature, making it a reliable source that covers a diverse scope of relevant fields –, several unstructured searches were conducted, in which 'mobility', 'sustainability' and 'gender' were combined. The search was also restricted to publications from 2010 on, so that the sources and the results were as up-to-date and pertinent as possible for the thesis at hand.

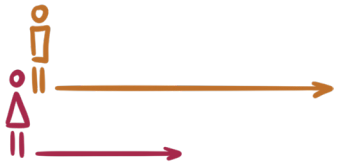
Throughout the review phase – as well as the whole thesis – it was not only the articles or other pieces of literature that were analyzed, but also the reference section included in them, a technique known as 'snowballing' that allowed the project to stretch in directions it might have not if it had reduced itself to the initial searches conducted. This initial and broader part of the review will be summarized in the first section of this chapter.

Taking into account the conclusions of this introductory analysis, and tying into the fact that most of the literature reviewed is concerned with Western culture, it was decided that this project's scope was limited to Denmark, and more specifically, the Copenhagen area. Because of this, further, more specific research on the previous topics guided by this geographical limitation was tackled and will be presented in the second section. In the third section, a brief more detailed exploration of the methodologies presented in the previous chapter will be outlined, aiming to provide the reader with a finer understanding of the context. Finally, the research question that this thesis will focus on is formulated, along with detailed sub-questions that will contribute to both limiting the scope of the project and in moving the study forward.

2.1. WHAT CONNECTS GENDER, MOBILITY, AND SUSTAINABILITY?

Building upon the ideas presented in the introduction of this master thesis, this section of the literature review aims to depict and contextualize a comprehensive vision of the existing connections between these three concepts in the way they are defined in the introduction. When looking at the intersection of gender and mobility, the first important point to make is that women and men use the transport system in significantly different ways, as a growing body of research supports (Beall, 1996; Frändberg & Vilhelmson, 2011; Polk, 1998; Uteng & Cresswell, 2008). The manner in which these patterns differ is summarized hereafter.

Women travel shorter distances, also when travelling to work



(Breengaard & Oldrup, 2009; Christiansen & Baescu, 2019; CIVITAS, 2014; de Madariaga, 2013; EIGE, 2016; Frändberg & Vilhelmson, 2011; Næss, 2008; Rosenbloom, 2006; Sandow & Westin, 2010; Sovacool et al., 2019)

Women make less use of the car.

(Rosenbloom, 2006; Schwanen et al., 2002; Srinivasan, 2008; Tanzarn, 2008; Vance & Iovanna, 2007)

Women tend to walk, bike, and use public transport more than men

(Breengaard & Oldrup, 2009; Christiansen & Baescu, 2019; Cristaldi, 2005; de Madariaga, 2013; Frändberg & Vilhelmson, 2011; Hjorthol, 2008; Jørgensen, 2008; Kronsell et al., 2016; Næss, 2008; Polk, 2003; Rosenbloom, 2006; Sovacool et al., 2019; Srinivasan, 2008; Vance & Iovanna, 2007)

Women are more likely to escort other passengers, such as children and elderly people

(Christiansen & Baescu, 2019; CIVITAS, 2014; Greed & Reeves, 2005; Sovacool et al., 2019)

Women are more likely to trip chain

(Breengaard & Oldrup, 2009; CIVITAS, 2014; de Madariaga, 2013; EIGE, 2016; Frändberg & Vilhelmson, 2011; Greed & Reeves, 2005)

Men are more likely to travel for work related trips during rush hours

(Beall, 1996; CIVITAS, 2014; EIGE, 2016; Greed & Reeves, 2005)

Women are less willing to travel after dark

(EIGE, 2016)

Women are more willing to adapt to more sustainable transport modes.

(CIVITAS, 2014; EIGE, 2016; Hjorthol, 2008; Kronsell et al., 2016; Polk, 1998; Sovacool et al., 2019)

Men tend to use cars, motorcycles, e-scooters, segways, scooters, and skateboards more

(Christiansen & Baescu, 2019; CIVITAS, 2014; de Madariaga, 2013; Frändberg & Vilhelmson, 2011; Sovacool et al., 2019)

Men are more likely to own a car – both combustion and electric.

(Beall, 1996; CIVITAS, 2014; EIGE, 2016; Greed & Reeves, 2005; Sovacool et al., 2019)

Men are more likely to use sharing-services, such as bike-sharing and car-sharing.

(Alonso-Almeida, 2019)

Women tend to be safer drivers

(CIVITAS, 2014; EIGE, 2016; Jørgensen, 2008; Prati et al., 2019; Sovacool et al., 2019)

Women are less likely to be involved in car crashes, but are more likely to be injured when involved

(Forman et al., 2019; Transportation Research Board, 2006)

Table 01 + Figures 08 to 20
Gender differences in mobility patterns.
Illustrations inspired by Porrazo and Samson (2020)

More recently, as a piece of work with a bigger focus on the third aspect studied as the core of this thesis – sustainability – it is worth acknowledging Rambøll's report on Gender and Mobility (2021). Built on the premise of 'gender mainstream as a critical tool for achieving gender equality, this report aimed to gather knowledge into gender differences in mobility. Its final aim was to lay the foundations for creating a mobility system that is better and more equitable for everyone, given that what are considered 'women-friendly' solutions would create a more equal system for all, given that, if gender is not made an intrinsic part of the design process, solutions are most likely to benefit men.

To do so, it collects gender-disaggregated data from 7 different countries – Denmark, Finland, Germany, India, Norway, Singapore and Sweden – in an attempt to bridge the existing data gender gap and include gender in the design and planning of transport and mobility systems in an attempt to make it more sustainable. The results are compiled down below, and support some of the findings from the general research presented earlier.

DIFFERENCES IN MODES

- Women walk more than men.
- Women use public transport more than men.
- Women cycle less than men if there's no or poor cycling infrastructure.
- Men drive more than women.
- Women are often the passenger.
- Men use new mobility services more than women.

DIFFERENCES IN EXPERIENCE

- Women to a greater extent than men worry about harassment.
- Women to a greater extent than men think about the route and time of day traveling.

DIFFERENCES IN TRIPS

- Women travel shorter distances pr. trip than men.
- Women trip chain and have multiple stops to a greater extent than men, who generally have an A to B trip pattern.
- Women to a greater extent than men accompany children or other family members and/or carry bags and groceries.

DIFFERENCES IN WORKFORCE

- Women's work participation is lower than men.
- Women to a greater extent than men work part time.
- Women in general earn less than men.
- Women in general have the majority of the parental leave.

The previously presented data reinforces Hanson's (2010) statement that "women's travel looks more like sustainable mobility than does men's travel" (Johnsson-Latham, 2007; Plaut, 2004; Polk, 2003; Zauke & Spitzner, 1997). In her work, she asserts that the inherent connection between gender and mobility and how deeply they influence each other is nothing new to feminist research, which has been concerned o the matter for some time now.

The reasons as to why these differences exist have also been studied, and they related to both the values and the needs that men and women – when understanding these two from a socially constructed perspective. Traditionally, some feminine and masculine values have been attributed to certain forms of transportation (Breengaard & Oldrup, 2009; EIGE, 2016; Kronsell et al., 2016; Sovacool et al., 2019; Uteng & Cresswell, 2008), and have conditioned who uses them and how. An example of this could be that speed and power are values associated with cars as well as masculinity (Breengaard & Oldrup, 2009; Sovacool et al., 2019).

Another explanation for these differences in mobility may stem from existing inequalities in the labour market (Beall, 1996; Breengaard & Oldrup, 2009; CIVITAS, 2014; de Madariaga, 2013; Sandow & Westin, 2010; Singh, 2019). After all, women are more likely to have a part-time job than men (CIVITAS, 2014; de Madariaga, 2013; EIGE, 2016; European Union, 2013), the gender pay gap is still not closed (European Union, 2013; Hjorthol, 2008)and workplaces with more men or women are distributed unevenly through the city (Breengaard & Oldrup, 2009; Singh, 2019). There is also an uneven distribution of unpaid work – including household work, care for children and the elderly and

dropping off and picking up children (Beall, 1996; CIVITAS, 2014; de Madariaga, 2013; Frändberg & Vilhelmson, 2011; Hjorthol, 2008; Sandow & Westin, 2010) –, the responsibility of which is usually placed on women. Finally, an average woman navigating the transport environment both feels more unsafe and has a higher chance of being harassed (CIVITAS, 2014; de Madariaga, 2013). Although presented separately, it is important to keep in mind that – as it can be gauged from the descriptions and the fact that they appear next to each other in some of the research – they are all deeply connected to each other, and feed off each other.

Going back to Hanson (2010), however, it is posed that so far there have been two strands of research regarding the relationship between gender and mobility, one concerned with how does mobility shapes gender, and another one concerned with how does gender mobility. In both cases, Hanson argues that one of the two dimensions has been emphasized to the neglect of the other. Even with that being the case, an interesting point is highlighted in the essay, and it is that even when starting from different assumptions and understandings of gender, using different methodologies and considering different elements of mobility and context important, both reach a common fundamental message.

With this in mind, Hanson argues for the need for further research that aims to unify these diverging strands of research if sustainable mobility is to be reached, and that it should be structured around the need for across ways of thinking about gender and mobility, across quantitative and qualitative studies and across places (Hanson, 2010). To do so, context needs to be made central through in-depth, context-sensitive, place-based, qualitative and quantitative studies carried out

2.2. GENDER AND MOBILITY IN DENMARK

Taking into account the previously stated relevance of context as something central in further research, and the scope of this thesis, further detailing of the existing relationship between gender and mobility in Denmark will be presented in this section.

When looking at Rambøll's report (2021), the results from the Danish survey do not significantly vary from those of the general one. The relevant gender-disaggregated data about Copenhagen or Denmark available on the report has been collected below.

- In Denmark, 73% of women hold a driver's license, as opposed to 82% of men.

- In Denmark, 41% of women own or have access to a car, as opposed to 50% of men.

- In Denmark, 87% of women own a bicycle, as opposed to 83% of men. According to the report, Copenhagen is the only capital where more women than men own a bicycle. In Copenhagen, 54% of women and 59% of men rate themselves 'very experienced' when enquired about their cycling abilities.

- In Denmark, 21% of women report walking regularly, as opposed to 17% of men, and 175% more women than men identify 'traveling with groceries and bags' as a challenge in Copenhagen.

- In Denmark, 15% of women report cycling regularly,

as opposed to 14% of men, with 87% of women and 83% of men having access to a functional bicycle. 59% more women than men identify traffic safety as a challenge in Copenhagen.

- In Denmark, 8% of women report using public transport regularly, as opposed to 7% of men. In Copenhagen, data show that 57% of the bus passengers are women.

- In Denmark, 39% of women report driving a car regularly, as opposed to 52% of men, while 18% of women report being a passenger regularly, as opposed to 10% of men. In Copenhagen, 32% more women than men associate the car with it a problem in relation to CO2 and climate change.

Another relevant element in this context is the Danish reluctance to address gender inequality. This is not only limited to gender, as Nordic people seem to be disinclined to talk about social differences in general, since it might be perceived as an attack on the Nordic welfare system as well as each other's personal identity. A feeling of belonging to the middle class, as well as wanting to be part of the 'norm' and seeing themselves as equals to each other and in front of the law is commonplace among citizens of the Nordic countries (Freudendal-Pedersen, 2013).

As part of her interview for the Gender and (Smart) Mobility (2021) Rambøll report, Freudendal-Pedersen also states that men's and women's different mobility patterns, needs and values are not addressed in transport planning in Denmark – pleading that, because men and women are already so equal, gender differences do not need to be addressed anymore. However, she states, mobility in Denmark does have gender biases. Decision-makers are mostly men, and they are the ones deciding what is of value in mobility, making a difference between 'hard' and 'soft' measures, mobility, or data. A distinction that is gendered in and on itself, and emerges as a barrier for creating a more sustainable mobility.

According to Andersen and Shamshiri-Petersen (2016), Denmark seems to be more determined to maintaining gender roles and less concerned with gender equality being a problem than its neighbouring Nordic countries, even stating that gender differences are "surprisingly big" while support for gender equality is "surprisingly low" (Andersen & Shamshiri-Petersen, 2016, p. 9). Nielsen (2017) looks to Borchorst et al.'s take on the history of feminism in Denmark, and how its early consolidation can serve as an explanation for the current disregard and apathy towards gender equality as something that has already been achieved. This links to Borchorst and Siim's (2008) use of Denmark to demonstrate that state feminism can fail, gender equality policies can be weakly institutionalized, and the gap between the state's version on gender equality and the real gender imbalance that feminism can pinpoint can still grow, even in a welfare-state with a prominent women's movement.

In summary, and as Freudendal-Pedersen (2013, p. 213) puts it, "in a country like Denmark, wanting to represent a modern and equal society, it is simply not ideologically correct to articulate social, economic or cultural differences".

2.3. WHY FEMINISM? AND WHAT KIND?

This last section diverges slightly from the previous two in content, and focuses specifically on succinctly reviewing the relevant knowledge regarding Feminist Design Theory – chosen as a framework for this project. Although there is a long activity of feminist activity in design, it has been only in the past couple of decades that research has been expanded in an attempt to establish Feminist Design as a methodology. Taking this into account, this section does not attempt to summarize the whole body of work done in that regard, but rather give a broader context for how the thesis guidelines inspired by Baker's demands in her work Post-work Futures and Full Automation: Towards a Feminist Design Methodology (2018) came to be.

When looking at design and the limits and potentials it might have, it is important to remember that the historical development of design as a profession, a discipline and a practice is deeply tied to the raise of consumer culture (Papanek, 1972), and its consolidation contributed to linking the economic to the cultural (Julier, 2000).

As a consequence, design methodologies have been developed to serve the market and 'add value' to products and services, a value defined by this traditional all-knowing figure of the designer as an expert – which has played a complicit role in making Eurocentric and patriarchal ideas predominant, along with making design one of the causes for environmental degradation due to an excessive production of consumer goods. Although the development of design is part of the history of capitalism, it is not inherently capitalistic in nature, and new perspectives on the discipline such as design thinking or participatory design go against this conventional understanding of design. Transition design – previously described in the Theory and Methodology section – also tries to bring to life this post-capitalistic future, through an ontological reorientation that no longer understands the user as a consumer (Baker, 2018).

Taking all of the previous into account, in her work, Baker argues that "the role that designers play in the materialisation of gender inequality manifests itself in design methodologies" (Baker, 2018, p. 545) and therefore a feminist design methodology is necessary to avoid reproducing existing inequalities. She then proceeds to provide a first sketch of what Feminist Design Methodology could be, which is the one this thesis adheres to.

Even though Baker's guidelines already touch upon this subject, it is crucial to highlight that an intersectional perspective in this context is essential. Originally coined as a term in 1989 by Kimberlé Crenshaw, she recently described it as "a prism for seeing the way in which various forms of inequality often operate together and exacerbate each other" and argued that "all inequality is not created equal" (Steinmetz, 2020).

What this approach shows is that different social identities can overlap and create multifaceted experiences of discrimination – related to e.g. gender, class, sexuality or immigrant status –, in which the final result is not just the sum of its parts. The intersectional perspective also sheds light on the historical context of some of these discriminations. All in all, what intersectionality aims to do is to understand the depths of these inequalities and how they interplay with each other by bringing

discriminated voices to the forefront. When taking into account that the impacts of crises are not uniform, injustices must not go unnamed or unchallenged and a new 'normal' must be fair for all, it is a given that the fight for equality should not stop at gender, but rather should aim to end all forms of oppression – with intersectionality working as a framework to create movements that aim to end overlapping forms of discrimination, and build back better.

2.4. RESEARCH QUESTION

In the previous desk research, the relationships that have been drawn so far between gender, mobility and sustainability have been explored, both in a general context and more specifically within the Danish situation. This thesis aims to take a gender perspective to come up with a proposal for a sustainable mobility system and so, based on the material presented so far – both the literature review and the theory and methodology that was presented earlier – the final research question is formulated.

What could a feminist mobility system look like?

To ensure a thorough answer to the research question, the following points must also be considered.

Why do women have more sustainable practices?

Can feminist design theory and design for sustainable transitions build upon each other?

In the last few pages, a summary of the design of the research process, encompassed within the theoretical framework and the methodologies of choice, as well as the subsequent literature review and state of the art performed on the topics was presented. It aims to combine content that has been part of the Sustainable Design Engineering Masters Programme with other relevant knowledge and materials on the topic, bringing the author's previous academic background and empirical learnings from other projects into the mix. Making Intersectional Feminist Design Methodology a core component of the Design for Sustainable Transitions framework could enhance Social Sustainability.

Through this, a final problematization and research question has been formulated as a conclusion. This question aims to bridge knowledge gaps and move the sustainability agenda forward.

After laying the theoretical foundations for the project, this thesis will move forward by involving relevant stakeholders in the Design Process, such as Experts in Mobility, Gender or Sustainability – or any combination of them –, as well as perform Participatory Design through Gamified Workshops.

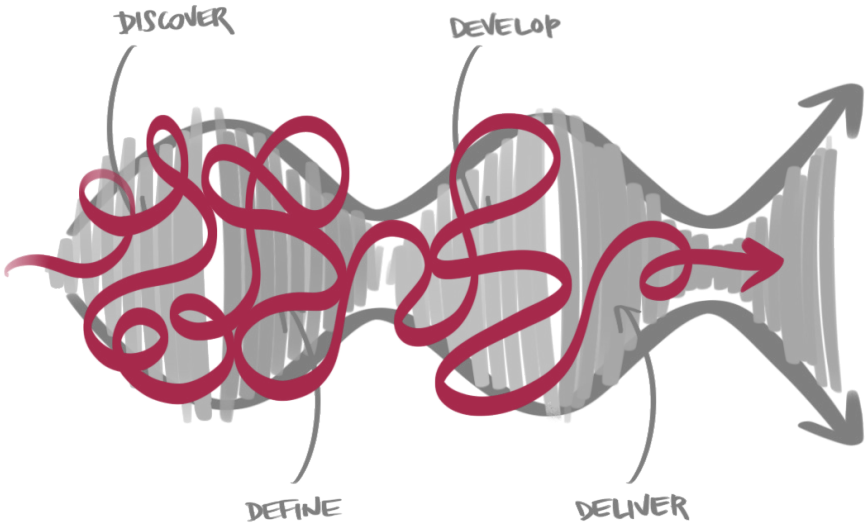


Figure 21. Design Process Diagram, based on the Double Diamond

3. Empirical Work

This section aims to complement the knowledge gathered in the previous discover section, as well as enable participatory design and exchange of knowledge through design games in order to answer the research question.

3.1. EXPERT INTERVIEWS

In order to add qualitative value to the literature research performed so far for the thesis, as well as to gain insight into the personal perspectives, values and impressions of people involved in this field of study directly or indirectly, it was decided to perform semi-structured interviews that could open new avenues to explore by letting the interviewees express their interests and concerns.

The experts were chosen taking into account their field of expertise, their willingness to participate in the study and their availability to do so. A template with a series of baseline questions was created for the interviews. The aim was to facilitate the discussion and ensure that there was thematic consistency in the conversation and in the answers of the people interviewed. It was, however, not a strict guide, and the interviews were adapted both during the interviews themselves – depending on the answers and the different topics they led to – and along the whole process, improving the template to enable better and more complete discussions – these changes were also made based on feedback obtained from the interviewees themselves. The main questions were based on the knowledge previously gathered in the theoretical and literature research sections, as well as the research question and sub questions, and structured around previous knowledge and experiences in stakeholder engagement. Sidetracks were not avoided but rather encouraged, in the sense that it could allow new perspectives on the topic to be discovered.

3.1.1. Structure

All of the interviews except for one – which was possible to perform in person – were held through Zoom. All of the interviews were recorded, and the files are available if needed. After a short introduction to the thesis and the main concerns it aimed to touch upon at that time, conversation was started around the main questions, as they follow

Do you think there is a link between gender and sustainability? If so, which?

Why did you decide to look at gender in this context?

Why do you think the gender perspective is relevant in the mobility context?

To facilitate the dialogue, worksheets summarizing in a visual way the part of their work that was considered relevant were shown to the participants, aiming to be boundary objects in the knowledge exchange process.

Following the discussions around these questions, which will be individually detailed later on in this section, a small mapping exercise based on Practice Theory that concerned the current and the possible future mobility practices was performed. To do so, the interviewees were shortly introduced to the basics of Practice Theory – its main concerns, how it understands what a practice is and the different elements that give it shape – and presented with a simple, previous mapping of the current system.

Finally, the interview was ended with a short feedback conversation.

In the following paragraphs, the interviewees will be presented in the order in which they were performed, followed by individual and general insights and reflections in the way the interviews were structured.

Marianne Weinreich

Market Manager in Rambøll's Smart Mobility department. She is also co-founder and Chair of the Cycling Embassy of Denmark, and an experienced speaker at and moderator of cycling and mobility conferences all over the world. Weinreich holds a Master in Scandinavian Literature and Language and World History, but in the past 20 years has promoted cycling and sustainable mobility in cities, as well as advised about mobility management. Her focus is on how to help people make smarter, healthier and more sustainable choices when they move around cities every day. At Rambøll, Weinreich manages the Smart Mobility's sustainability and Thought leadership program. The Smart Mobility department at Rambøll has branches in Denmark, Norway, Sweden, Finland, Germany, Singapore, and India. Last year, this department published the 'Gender and (Smart) Mobility' (2021) report as part of Rambøll's Green Paper series, in which they tried to "shed light on the need to include gender in transport planning, in design of new mobility services and in the creation of better mobility opportunities for everybody" (Rambøll, 2021); this report and the results presented in it has also become part of the foundation of this master thesis.

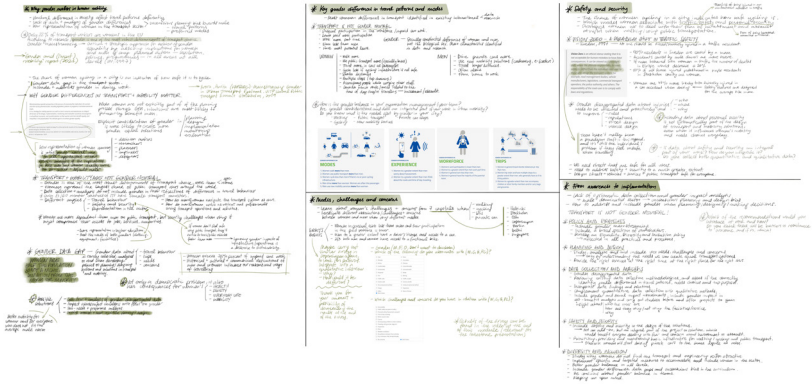


Figure 22. Boundary Object Worksheet Marianne Weinreich

Caroline Samson

PhD fellow at Aalborg University. She is working on research on the intersection of food, mobility, and housing practices; an understanding needed to support a green transition of our everyday life. Samson holds a Master in Sustainable Cities, and for her Master thesis examined 'Gendered transport planning: how Danish transport planning processes blackbox gender' (Porrazzo

& Samson, 2020) and studied the intersection of transport and gender in Denmark. The Danish context is considered particularly interesting because of a found reluctance in Denmark towards issues of inequality and general discussions about feminism.

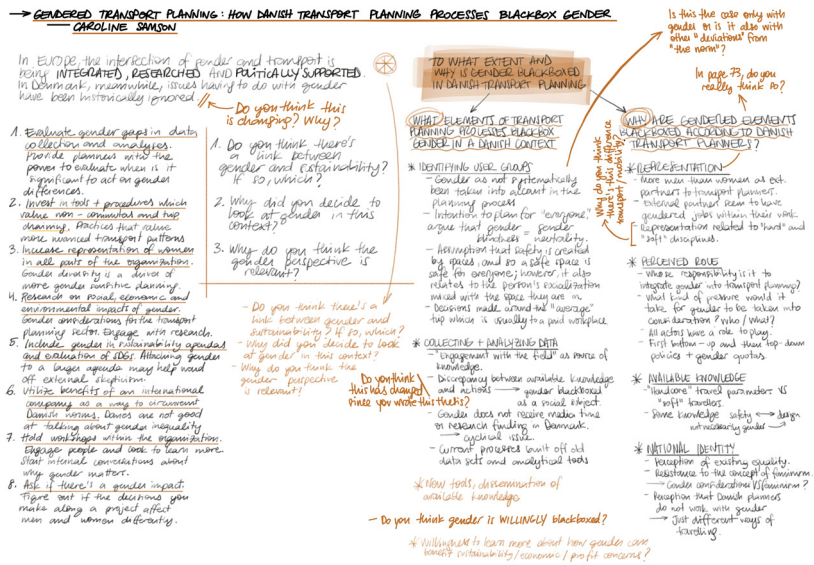


Figure 23. Boundary Object Worksheet Caroline Samson

Michala Hvidt Breengaard

Postdoctoral Researcher at Københavns Universitet. Breengaard has a background in Sociology, wrote her PhD thesis on “HOW TO MOTHER? Practices of infant feeding and the formation of maternal subjectivity among middle-class mothers in Beijing” is currently works in research concerning gender, diversity and mobility, specially cycling. Breengaard is also part of TInnGO (Transport Innovation Gender Observatory), a 3 years’ research project funded in the context of the HORIZON 2020 Programme of the EU, aiming to create a framework and mechanisms for a sustainable game change in European transport through a transformative strategy of gender and diversity sensitive smart mobility.

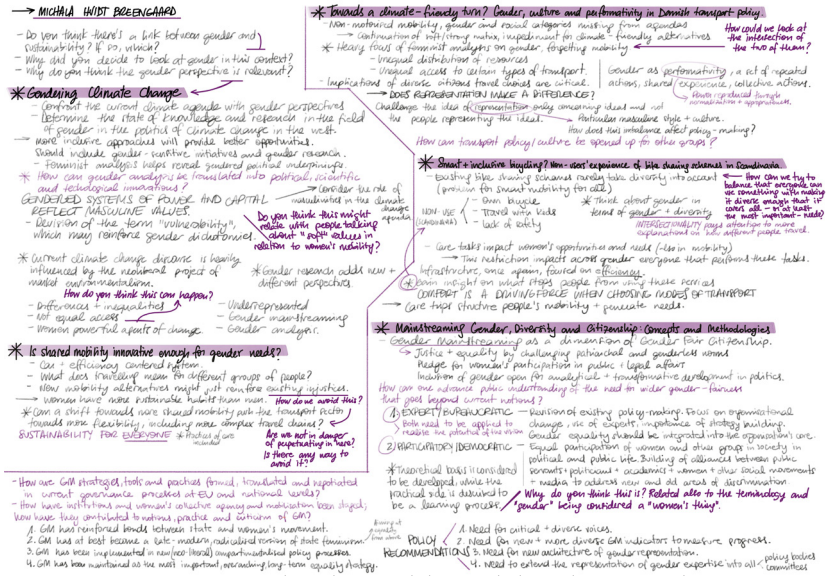


Figure 24. Boundary Object Worksheet Michala Hvidt Breengaard

Mia Hesselgren

Senior Researcher at KTH Royal Institute of Technology. Hesselgren currently works at the Department of Machine Design (MMK) and does research in Communication Design and Industrial Design. Their current project is ‘Empowering Energy Futures’. Hesselgren is a researcher in design for sustainable mobility, interested in how design can be used to support sustainable practices. In her doctoral thesis, Designing for sustainability practices: RE-DO Design Doings, Strategies and Postures (2019) she presents re-formulations needed of design as a practice when aiming to enable sustainability transitions.

She takes this exploration forward in the context of designing for sustainability transitions of transport systems including mobility services in her research. Hesselgren works with transdisciplinary research and uses collaborative design methods to engage with other research disciplines as well as with citizens, stakeholders from public and private sector, and civil society.

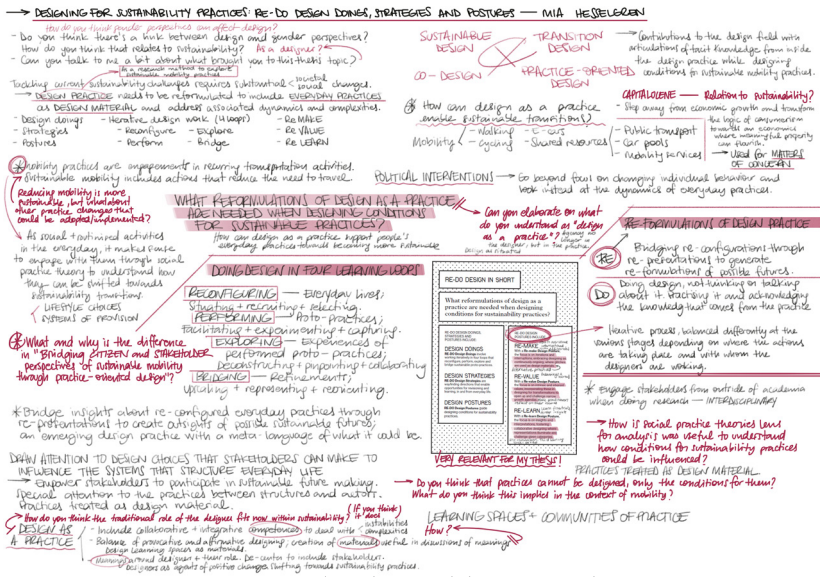


Figure 25. Boundary Object Worksheet Mia Hesselgren

3.1.2. Interviews

When talking about the link between gender and sustainability, all of the experts agree that there is indeed a connection between the two of them, more so in the context of mobility. And even though – as Samson explains – it usually gets overlooked, it is one that should be taken into account when pushing sustainability forward. Achieving gender equality is Goal 5 after all, in the Sustainable Development Goals, which states that it "is not only a fundamental human right, but a necessary foundation for a peaceful, prosperous and sustainable world" (United Nations, 2017). It also ties with Breengaard's and Hesselgren's reflections on the link between a sustainable system with a just system and therefore equality, and the fact that the moment people are involved in sustainable solutions, gender is always a relevant category, even if traditional or common mobility solutions tend to forget this.

Against this backdrop, the experts talk about the relevance of including a gender perspective when moving forward, to avoid seeing only half the picture, and they highlight the importance of having an intersectional approach – Hesselgren emphasizes – when doing so, to ensure encompassing diversity and taking into account the numerous facets that come with feminism, such as age or race. As Breengaard puts it, "sustainable solutions are only sustainable in the degree they are used". And so, if people are to use sustainable solutions, they should be designed so that it is desirable and convenient for them to do so.

However, in line with what research shows, the Danish experts highlight the existing reluctancy in the country to acknowledge gender differences, and comment on the fact that trying to bring in a feminist perspective usually sharpens the discussion – a reluctance to consider when touching on these matters, and that maybe even shows the relevance of putting gender on the table.

In relation to her work, Samson also notes the need to be aware that by continuing to talk about gender, it is possible that designers and planners will just replicate the duality of men and women. In this situation, it might happen that the outcome is just perpetuating the problem, rather than shedding light on it to fix

it, and it is something worth remembering when working within this field. It is important to bring this issue forward and make it visible for the people in positions of responsibility, educating them in how to spot this possible rebound effect.

In this context, Weinreich's emphasis on data collection when working with gender within the mobility and sustainability field becomes crucial. By collecting data, the way Rambøll did in the Gender and (Smart) Mobility report (2021), the conversation turns to facts instead of opinions, providing legitimacy. The report then proves that there is indeed a link between gender and sustainability, since it shows that statistically, women travel more sustainably than men and are reported to think about sustainability more.

However, it does not show what is the cause and what is the effect, which is something incredibly relevant in this juncture. Do women actively choose to travel more sustainably for the sake of sustainability or do they do it as a reflection of structural gender differences? Would they still do it in a different context without gender inequality? It is hence essential to not just think of women as being more sustainable, but rather deal with the challenges they face, taking their concerns more seriously and making them something intrinsic to new designs.

3.2. MAPPING TODAY'S PRACTICES

After creating a foundation for the project through the desk research and the Expert Interviews, it was deemed appropriate to create a final mapping of the current practice of mobility. This mapping would build upon the one that was presented to the experts, and it is supplemented with their knowledge. This is a clear example of the iterative nature of the project and the methodology of choice, and it attempts to explore practices in more detail by creating contrasts between the present and the future – which will be mapped later on.

Figure 26. Mapping of today's practice of mobility, based on Shove et al. (2012)

It is acknowledged that this approach would only provide a broad vision of the practice, given that it is also inscribed within other practices of everyday life and the fact that big variations might appear from individual to individual. However, given the scope of the project, it is still considered to create a relevant picture of the state of the practice.

When looking at the materials involved in the practice, it is quite straightforward to list them. Privately owned vehicles – e.g. a car or a bike – are needed nowadays to reach a destination, although it can also be done through public transportation. An infrastructure that supports the moving of these vehicles is also needed, and the vehicles themselves need something to fuel them and keep them moving. Within this whole network, the bodies of the people that move around should also be considered.

As for the competences, they mainly relate knowing how to move around and the different guidelines that dictate that – traffic rules, the law and social contracts. People also need to know how to operate the vehicle they are transporting themselves in.

And finally, the meanings. It is this part of the practice triangle the one the project is more concerned with, as it relates to the values people associate with mobility, which range from something that gives them freedom and allows for personal time to a stressful situation that is only considered a means to an end.

3.3. GENDER AND MOBILITY SUSTAINABILITY WORKSHOP

After the Expert Interviews and considering the previous research and the project's original intention to facilitate Participatory and Collaborative Design, it was decided to carry out workshops with people, aiming to analyse the results of these. This user involvement was carried out through the introduction of a Design Game, in which the participants would contribute to answering the Research Question, **WHAT COULD A FEMINIST MOBILITY SYSTEM LOOK LIKE**. Implementing Gamified Brainstorming and Roleplaying – which will be further detailed later on in this chapter –, the workshop aims to achieve the following goals:

- Facilitate the co-creation of a shared vision of a sustainable feminist mobility system.
- Spark the discussion around the relationship between sustainability and gender.
- Enable the imagining of future scenarios and the exchange of knowledge, aiming to push for changes in the present.

The structure put together for the following workshops draws from the Nordic Urban Mobility 2050 Futures Game, developed by Nordic Innovation (Nordic Urban Mobility 2050 Futures Game | Nordic Innovation, n.d.) – an organization under the Nordic Council of Ministers that aims to make the Nordics pioneers for sustainable growth by promoting entrepreneurship, innovation and competitiveness – in collaboration with Hellon – a service

design agency specialised in creating innovative solutions, co-creation, game design and design for sustainability – as part of their Nordic Smart Mobility and Connectivity program (Nordic Smart Mobility and Connectivity | Nordic Innovation, n.d.).

Its aim is to help develop a more sustainable, connected, integrated and seamless transport system in the Nordic region by promoting smart mobility solutions while reducing carbon footprints, increasing the quality of life and generating opportunities for Nordic businesses. The original goal of the game was to facilitate discussions on future mobility scenarios and plausible mobility modalities, their impacts and desired features.

It was decided to use an existing, already tested game as the foundation for the one that would be designed for the workshop in order to ensure as much as possible a successful outcome – specially given that the project is not as much about the game itself, but rather, the discussions the participants engage in within it, the way in which they engage in those discussions and the potential outcome. However, the game focuses on "plausible scenarios; not on extremely utopian or dystopian ones", which does not match with the radical sustainable transition approach of this thesis.

Thus, modifications based on the Sustainable Transitions theoretical framework described in the Theory and Methodology section of this thesis, as well as the research conducted into Feminist Design Theory and the conclusions extracted from the Expert Interviews performed, looking to enable the participants to envision what a feminist mobility system would look like and reflect upon it from a present perspective.

Building upon Garduño García and Gaziulusoy's (2021) work, the workshop plans to use storytelling to enable the participants create a future vision, but also to help them understand the implications of this conception, through what they call 'everydayness' – making this vision relatable.

The aim of the workshops was to create a potential possible future in which mobility is based on a feminist approach through everyday life stories along with co-creation and knowledge exchange between the participants. Through this generation of future scenarios, the workshop functions as a platform that facilitates relevant discussions and the creation of possible strategies to get there. By encouraging the participants to co-create their own scenario instead of providing them with a previously made one, the aim is to immerse them in the stories and personas they come up with – creating a better understanding of this future –, connecting with them on a personal level and facilitating interacting with each other and addressing potential conflicting views.

The participants were chosen based on their availability and willingness to take part in the workshop. It was decided to hold two, one with only people identifying as men and one with only people identifying as women, to see if there were any differences in the outcome as well as in the process of getting there.

In the following paragraphs, the dynamics and instructions of the game, as well as the process of the workshop itself will be summarized and reflected upon. A plan to improve the workshop for future work is also included at the end of this chapter. Both workshops were held physically within the Aalborg University Copenhagen's premises, and audio recording of the both of them is available.

3.3.1. Description of the game

3.3.1.1. Game Board

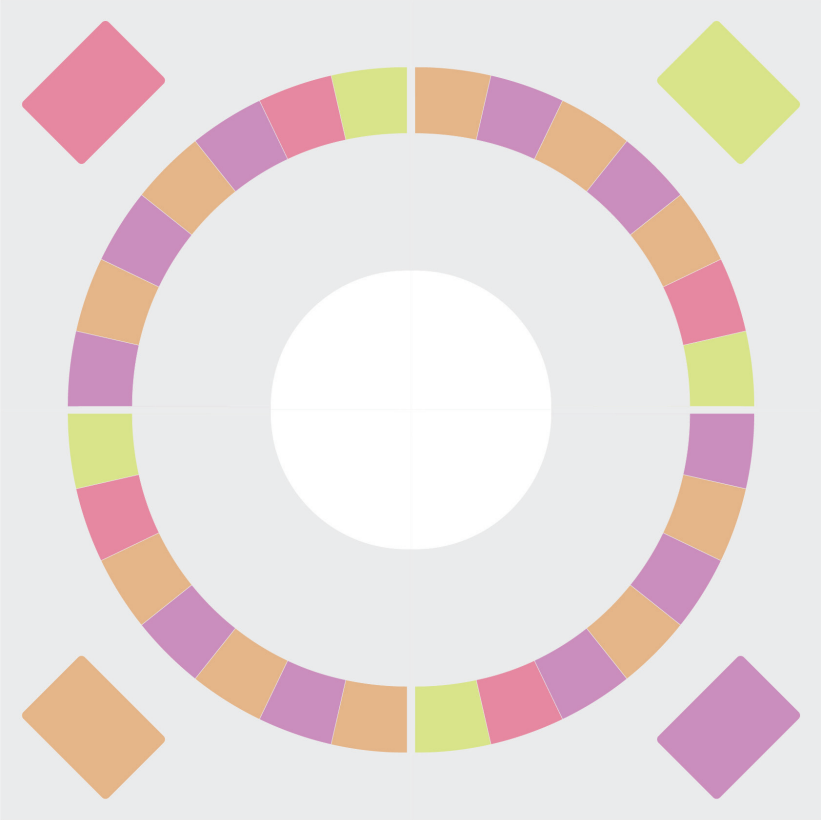


Figure 27. Workshop Game Board

The workshop will take place around a physical board acting as a boundary object, which will ground the participants in the activity taking place.

Figures 28 to 31. Depiction of Scenario, to be placed on top of the board

The aim of mimicking a board game was to create a relaxed atmosphere that would foster creativity among the participants. The drawings in the centre of the board depict scenes from the scenario that will be presented later.

3.3.1.2. Game Cards

GENERAL QUESTIONS

Worldbuilding related questions that help set the stage and give the participants an understanding of the world they are creating.

What is the economic outlook of society?
How do people use money?
Where do people live and what is their main means of livelihood?
How are goods transported? Think both within the city and between cities.
What is privately owned and what is shared?
What are the latest business models?
What does the living environment look like?
What does the living environment look like?
What do people eat and how is it produced?
How do people maintain their well-being?
How do people continue to learn?
What is the biggest difference in comparison to current cities?
How do people communicate?
What happened in the past that made this future state possible?
Is there a next-generation network and what does it do?
What do children do?
Has gender equality been reached?
What are the most important values for society?

MOBILITY QUESTIONS

Mobility related questions related to both how would the system work, and how would it fit within the bigger picture.

Is the mobility system based on shared or individual transport? Why? How?
Is the mobility system accessible to people with disabilities? How?
Does the mobility system encourage or discourage physical activity? How?
Do people travel more or less? Why?
Is the mobility system curbing climate change or adapting to crises? How?
Who governs the mobility system? How?
What are the fragilities of the mobility system in crisis situations? How have these been taken into account?
What changes have been made to digital of physical infrastructures? Give an example.
Is the city congested? Why?
Is mobility tightly or loosely regulated? Why? How?
How do users pay for mobility? Why?
Is the mobility system exclusive or socially just? How?
How do people travel long distances?
Is mobility between different modalities seamless? How?
How much city space is allocated for mobility and what forms or mobility are in use? Why?
How do people travel within the city?
How do people travel between cities?
What are the values associated with mobility?
What are the main competences people need to have when moving around?
What meanings do people associate with mobility?

FUTURE QUESTIONS

Aim to connect the present to the future and help the participants reflect on how to achieve it.

How well are you prepared for this future scenario?
How well is society prepared for this future scenario?
How well is mobility nowadays prepared for this future scenario?
How much of today's mobility system do you think we will find in this future scenario?
How much of today's economic system do you think we will find in this future scenario?
What kind of ideas form this scenario could be implemented today?
Should new technologies be developed today in order to realise this scenario? If so, which ones?
What new professions, services or innovations can you see arising from this scenario?
Which actors do you think need to be engaged to realise this future scenario?

PEOPLE'S ROLES

Different perspectives that might not be present in the room at the time of the workshop. From the moment a participant picks up a role card, all questions and discussions they engage in need to be answered from the role's perspective.

MAYOR OF THE CITY

As mayor, she has to ensure that citizens can move hassle-free throughout the city in a manner that encourages an active lifestyle and also promotes well-being. She is trying to achieve a balance between user convenience, operator efficiency and best use of investments.

1. How does she ensure mobility is regulated and governed?

2. What are the biggest questions on her table?

MOBILITY ACTIVIST

Mobility is a contentious field and includes actors from private, public and civil sectors. As an activist she is critical of the way mobility is currently organised and she promotes alternative means of transport.

1. What is her aim and why does she criticise the mobility system in the co-created scenario?

2. What are the alternatives she promotes?

NEWCOMER

She is a newcomer still building her daily life in her new surroundings. Due to differences in language and culture, she is encountering a few challenges that make it more difficult to adapt.

1. What kinds of mobility needs does she have?

2. What kind of challenges does she encounter regarding mobility?

SCHOOLCHILD

She has just gained the courage and permission to move around the city on her own. She has hobbies she wishes to pursue and friends she wants to visit.

1. What modes of mobility does she use?

2. How did she learn to move about?

PROFESSIONAL

As an active professional living in the city, she engages in daily physical interaction with her local community as well as virtual contact with a global network of collaborators. Mobility is not just a physical, but also virtual, way of being present and communicating with her network.

1. Where does she live and work? What is her profession?

2. What modes of mobility does she use, and how much does she spend commuting?

PERSON WITH A PHYSICAL DISABILITY

Even though she relies on mechanical support to move around the city, she can still be independent, and only needs assistance when tackling more physically demanding tasks.

1. What means of mobility support are available to her?

2. What advantages or disadvantages does she have compared with people with disabilities is the past?

TEENAGE GIRL

She is already comfortable when navigating the city and enjoys spending time in public spaces, especially if the weather allows.

1. What kind of modes does she use?

2. How can public spaces ensure that she can transit them safely?

SENIOR WOMAN

Most of her mobility is focused on leisure and physical activity to keep herself healthy and meet family and friends. She enjoys moving through the city and she is not especially concerned with sticking to a schedule.

1. Does she encounter any challenges due to her age, and if so, what are they?

2. How can it be ensured that she keeps not needing to rely on others to move around even as she ages?

NEW MOTHER

She recently had her first child and she has to re-learn how to navigate the city taking them with her, both for leisure and to deal with various everyday tasks.

1. How did she have to adapt her way of moving and choice of mobility modes?

2. What kind of new challenges does she encounter?

SINGLE MOTHER

She takes care of her children while still being an active professional, and to do she relies both on the network of people and services in her neighbourhood and her children's ability to be independent thanks to it. As a professional, she is an active participant of this network.

1. What are the characteristics of the network that make it possible for her to be so reliant on it?

2. What kind of challenges might she encounter as a professional single mother?

3.3.1.3. Dynamics of the Game

The board, the cards and its different purposes were presented to the participants at the beginning of the workshop. The participants are supposed to move their tokens around the board according to the number they get from rolling the dice, and they have to pick up a card that matches the colour of the square they fall in. They will try to answer the question, and a discussion will be facilitated with the rest of the participants after an initial answer. If they get a role card, they will also be asked to answer the questions appearing in the card – these answers will appear in green boxes as the workshops are described.

Before the start of the game, the participants will be asked to briefly introduce themselves to each other and talk, present their interests in participating in the workshop and talk about their current mobility habits to help contextualize the game.

3.3.2. Description to the Scenario

Before starting the game, the participants were introduced to the scenario featured below. It was also specified that the thesis takes place in a Danish context – in the municipality of Copenhagen, more specifically. The aim was for the scenario to be radical enough that would inspire the participants to come up with forward-looking solutions, while being relatable enough that they did not lose sight of this happening within their lifetime.

"The future is here; we are in the year 2037 and the consequences of climate change are highly visible in daily life. Some areas in the global south have become difficult to inhabit, due to flooding in coastal regions, global population growth and compromised food security. This has caused an uncontrolled influx of climate immigration towards the northern countries' habitable climate. Unpredictable, extreme weather events are frequent, and global conflicts over insufficient food supplies and raw materials occur daily, and the fact that supply lines and supply schedules are not a certainty anymore has forced society to be as self-sufficient as possible.

However, not all hope is lost. The wellbeing of the planet is valued above everything. Individuals' rights have been restricted in favor of a prospering ecosystem. Consumerism is a thing of the past, and the dominant form of economy is circular, which has become essential due to unreliability previously mentioned supply chains. The streets are dotted with repair shops and makerspaces, all of them taking pride in recycling every piece of waste they get. The welfare model has been reinvented, and no one lives below the poverty line. Society as a whole, however, is not as rich as it would be expected, mainly because the constant growth model has been outdated as it is not really desirable in this context. As economic survival is secured, citizens have more time for recreation, socializing, and personal interests. New forms of working have emerged, and many are inclined towards self-employment and freelancing.

Mobility has been reduced, and not everyone is moving at the same time. The predominant car-centric model of the present has been left behind – partly because of the cost of owning and maintaining it, partly because the distance travelled to get places has been drastically reduced, but the number of trips has increased, so out of convenience people choose other forms of transportation, such as walking or cycling. Care trips and trips done to take care of household tasks are as common – if not more – as work trips, which also contributes to creating networks of people living in proximity to each other.

Urban areas are polycentric and characterized by mid-rise buildings. Local neighborhoods are mostly organized as self-sustaining villages in terms of energy, food, constructions and production. These communities utilize alternative energy sources, greenhouses, shared modelling and fabrication tools. Self-sufficiency of the communities minimizes its members' needs for transport. This new society model has emerged out of the hardships surfacing because of the climate situation, and people rely on each other to make it work.

Local citizens have the power to decide how to collect and invest common funds, and how to organize functions that affect their lives. The inhabitants of an area can decide locally where to establish schools, community centers and working hubs, and how to organize last mile transport. They use a common communication platform for proposing initiatives, discussions and decision-making."

The scenario combines excerpts of text present in the Nordic Urban Mobility 2050 Futures Game with reflections extracted from previous research and the Expert Interviews.

Figure 32. Men Workshop in progress I

3.3.3. Men Workshop

As specified before, all of the participants in the first workshop were men. Although with different backgrounds, all of them are concerned with sustainability in one way or another – which is one of the reasons they all agreed to participate in the workshop. All of their ages and backgrounds are summarized in the following Table 02.

Alex	27	Mechanical Engineering
Gorka	24	Industrial Design Engineer + Sustainable Design Engineering
Nicola	35	Physicist + Material Scientist
Oskar	26	Sustainable Design Engineering
Sinan	33	Civil Engineering
Vincent	27	Architecture & Civil Engineering + Sustainable Design Engineering

Table 02. Name + Age + Background Participants Men Workshop

When enquired about the modes of transportation they used, the bike was a common denominator among all of them, supplemented in some cases with public transportation – such as train or bus –, their own vehicle – a van –, and finally, walking.

After an introduction to the context of the thesis and the dynamics of the game, the participants were presented with the scenario within which they would have to worldbuild and debate for the duration of the workshop by the facilitator reading it out loud. In the following paragraphs, a summary of the questions that came up during the workshop and the discussions that ensued will be laid out.

How do people use money?

Used as an introductory question by the facilitator, it was stated that in this scenario money it is still a thing – however, given the context of self-organised neighbourhoods and with circular economy being more relevant than it is nowadays, it is very possible that there is some trading with goods and services, maybe even going back to buying raw materials or seeds.

Where do people live? What are their main means of livelihood?

When discussing the first part of this question, there was a common agreement on people living in self-sufficient neighbourhoods – as presented in the scenario – and on the fact that the scale of what we have traditionally considered cities or towns might change, moving towards bigger but at the same time more de-centralized cities.

However, more diverse opinions emerged when answering the second part of the question. Two main possibilities were discussed. As phrased by one of the participants, “either going forward by going backwards, or going forward through technology”. In the first alternative, a return to traditional lower level jobs – such as farming – and service jobs was discussed, given the context of locally sourced and developed products, the fact that supply lines are expected to be unstable and the mainstreaming of circular economy. In this scenario, a move towards a more vegetarian diet would allow for more space for traditionally growing food in fields.

The second alternative also acknowledged the need for manual labour, but expects it in a different way – instead of going back to traditional jobs, technology would be developed further, so that – to keep with the farming analogy – vertical farming allows for cultivating more food in less space in a more efficient manner. In this case, there would be more knowledgeable workers, put in charge of maintaining the technology in place. Finally, a combination of the two possible scenarios was discussed as well, introducing the possibility of a low-tech structuralizing of production.

MAYOR OF THE CITY ROLE INTRODUCED – OSKAR

Decentralization of the mobility system, public transport paid through taxes. Create a just mobility system is her number one priority. Also concerned with social coherence in the neighbourhoods, along with reconnecting people with their environment and each other through a less alienating system that allows people to keep in touch with their surroundings.

What is the economic outlook of society?

Two main points were established in this question. First, globalization has probably slowed down – maybe even stopped – and so, there is going to be less imports and less exports, and countries are probably going to be less connected – and less dependent – on each other, economically speaking, with countries spending more money on themselves. Somewhat related to this point, the economic model will most likely not be based on growth any more, with consumerism going down because people lack that extra money to make unnecessary purchases. A more socioeconomic model is proposed, with investments being made into people rather than into major business. The circular economy model and its relationship with closing the income gap were also acknowledged by the participants in this question.

How/if do users pay for mobility?

After a short reflection on the fact that people would need to pay for the materials they need to move around – shoes or bicycles, for example – and the role the makers economy would play in this, the participants agreed that the makers economy present in this scenario would need to account for the uncertainty of resources, and so people would need to have the basic skills that allow them to repair stuff, even if they do not really need to all the time. After this, it was quickly established that public transport should be free, paid by taxes – which would work well in the danish context, given that people here are more willing to contribute through taxes to services that benefit the whole of the population than in other places. From the premise of mobility being a public right, the proposed idea is that public transportation is decentralized, and the responsibility of each neighbourhood, albeit with the support of the city and the municipality. The participants tied this with existing models in which, when these choices and planning are left to the people, they make it work, as well as with individual personal responsibility – in the sense that, if you feel a personal connection with how public transportation is run because of where you live, you are more willing to do your part. In this scenario, however, intercity travel is probably expensive, so as to discourage unnecessary journeys.

MOBILITY ACTIVIST ROLE INTRODUCED – GORKA

Her aim is to push for and create a more just mobility system where people with social, physical or other kind of needs can move freely to other places of the city to which they might not have as much access to now – because time, convenience or accessibility. Infrastructures might have changed but there is still a need for a cultural change that accounts for people with different needs. Alternatives – more individualized and customized forms of transport, it can be done through services.

Figure 33. Men Workshop in progress II

NEWCOMER ROLE INTRODUCED – NICOLA

Does not have her life adapted to this decentralized system that is more similar to an agglomeration of towns than to the traditional image of a city. She needs to travel longer distances and along not so standard routes than others, and she needs to figure out more efficient ways to do this. To her, the system appears to be substantially more complex and less efficient than what she is used to.

What role does gender play in this society?

There was general agreement in this question that society would – hopefully – strive towards a more equal, inclusive and diverse society, and so, gender would play no significant role. Although this statement was made early on and all of the participants seemed to wholeheartedly agree, a conversation ensued about what does this statement exactly mean. Is it that society is completely blind to gender? Or is it rather that gender differences are acknowledged and accounted for? Relying on the understanding that gender and biological sex do not necessarily align and that people would be able to identify however they please – although not going too deep into that discussion –, the participants agree that gender should not play a role on a social level. They also state that probably, because of the scenario presented, the gender pay gap is also closed, and that following the current positive discrimination policies in place, the gender distribution in many professional fields will have evened out – although they comment on the fact that those policies might still need to be in place in the timeframe of the scenario. However, – and although they still use the word gender here, they are referring to biological differences, based on their previous argumentations – they address the fact that these physical differences need to be taken into consideration in order to create this more diverse and inclusive society and account for its complexity, in order to avoid the current situation in which the male is considered the average.

An interesting reflection that was made by the participants was that, “the people in this room do not really have a full picture of the role gender plays in society – we know it does, and we have an idea about what that entails, but we do not really know”, and that because of that, it might not be possible for them to consider all the possible ramifications this question might entail, and that maybe the answer would be different in the following workshop.

Is the mobility system socially just, and if so, how?

This question is the first one in which the participants truly rely on the roles that they have been given so far, and complement the worldbuilding with them.

The mayor’s answer is the most agreed upon, and building upon a comment made on the previous questions about society having reduced complexity for the convenience of the mass, reflects upon the fact that minorities and the way they move around are not accommodated for, because they do not fit the standard unit of design. Decentralization as it has been talked about before in a previous question would seek to solve this issue.

However, the newcomer and the mobility activist intervene, and while praising the intent, they question whether this decentralization would truly fit everyone's needs, or would it not be still inefficient due to its similarities with the previous one – that is to say, the present one right now – and its reliance on a not so changed urban structure. Concerns about possible ghettoization and of some areas related to the decentralization process are also raised.

This disagreement lead to a discussion around how much mobility is a human right and where to draw the line about the system being 'just'. The final conclusions were that there is a fine line to thread, given that a too accommo-dating system might end up being basically individual transportation, and therefore disconnect people from each other rather than promote the collectiveness that has so far been sought for by the participants, and more so, that the system "can aim to be just without being perfect".

How are goods transported? Think both within the city and between cities

Very straightforward in their answers this time, the participants agreed that transportation of goods and transportation of passengers could be combined through public transport, both within the city and between cities, supplementing it with e.g. Bike couriers when transporting goods in shorter distances. Given that long distance travel is limited and most of the areas are basically self-sufficient, it would not be necessary to transport as many goods and not so many people would travel that dis-tance, they argue it would be most energy efficient way that would make sense in this situation.

PERSON WITH A PHYSICAL DISABILITY ROLE INTRODUCED – ALEX

She probably has access to e-bikes or something that facilitates her moving around – even though she has all her needs covered in a radius.

What is privately own and what is shared in mobility?

Given that the level of wealth is lower, there is not many private-owned motorized vehicles, and the sharing of small- and medium-capacity motorized vehicles is much more common, in combination with privately owned bicycles and cargo bicycles. Participants pose that public transportation must be publicly owned in this scenario, since privately owned public transportation would miss the point of the mobility systems being just. In addition, the mobility activist advocates about the need for individualized service-based mobility options for people with disabilities and other minorities that might not be accounted for, that would facilitate inter-neighbourhood travelling and somewhat prevent ghettoization. The discussion concludes that it could be possible to provide a limited shared fleet of vehicles in each neighbourhood, supplemented with multi-passenger non-motorized vehicles.

How do people travel long distances?

Much debate was created in this question around whether long distance leisure travel should be limited by e.g. Rationing plane

miles or journeys, while trying to make air travel less co2 intensive; air travel was considered to be appealing to develop upon due to the fact that it does not an infra-structure to function. It was agreed that in the timeframe of the scenario the proliferation of high-speed trains would make more sense in order to reduce emissions, although further development would need to avoid centralizing the network around a node to avoid having a weak spot. The most relevant conclusion the participants came up with in this question was the fact that everything seems unrealistic until the decision is taken and move forward upon. Without active choice there is no progress and no possibility of change.

PROFESSIONAL ROLE INTRODUCED – VINCENT

Engineer that lives in the city. She mainly uses the metro and she has an approximately 20-minute commute. She chose this mode because she needs to work in an office and she wants to project a professional image so she chooses against a more active mode of transportation. Changes in working culture. Getting rid of the 9 to 5 makes it easier to create a more efficient public transportation system. More flexible working schedule that allows her and her partner to work at different times to look after their children.

SCHOOLCHILD ROLE INTRODUCED – SINAN

Although it would depend on the distance she intends to travel, she would mainly move around by bicycle, because the city is quite bike-friendly and she feels safe cycling around it, it is not dangerous. For longer distances, she would need to use public transportation, and depending on the connections it might be a bit overwhelming, if there is a lot of changes that she has to make. She learned from her parents and friends with more experience than her.

What values do people associate with mobility?

After a small initial confusion about what values and meanings entail, all the participants agreed that one of the most important meanings of mobility – both in this future scenario and in the pre-sent – is freedom. However, what this freedom entails in the future might be slightly different from what it entails now. While today freedom is related to the possibility and the ability to go wherever, whenever, in the future scenario it will be more related to the fact that you do not need to move around as much, as the places people need to travel to will be more accessible and closer, which would make people feel more self-sufficient, and like they own their mobility in a certain way. In this way, the meaning associated with freedom nowadays, such as convenience and speed either change or disappear – because they are not needed any more –, with comfort playing a more important role. It is also proposed than in this scenario in which you

do not need to move but rather choose to do so, the importance of the social component of mobility increases, helping people feel more connected to each other.

After the discussion, and having assigned the last two roles, the participants were enquired about what values did they think their roles associated with mobility. The answers are summarized in Table 03 below.

MAYOR OF THE CITY	Freedom, justice.
MOBILITY ACTIVIST	Improvable, lacking diversity.
NEWCOMER	Essential, disappointing. Decentralized structure makes it complex.
PERSON WITH A DISABILITY	Accessibility, security, still some constraints.
PROFESSIONAL	Speed, convenience, time is money.
SCHOOLCHILD	Not too concerned with speed, enjoys the trip, the company and her surroundings. Might use mobility as a way of socialising. Community feeling, happiness. However, long distances and public transport can prove to be scary.

Table 03. Values associated with Mobility, Men's Workshop

How do you feel about the scenario you created?

Once the worldbuilding process was finished and the time of the workshop run out, the participants were asked to reflect upon the scenario they created. They commented on the fact that it is difficult to imagine the transition from today's scenario to the one they proposed, because people are so used to moving around in their everyday life and to actually be required to move around to perform their daily tasks.

They reflected upon the fact that in this future the meanings associated with freedom may probably change, in the sense that it will not be so much about being places fast, but rather more about not having to move so often and therefore reclaiming that time. They also commented on the fact that, unconsciously, they constructed the scenario around the assumption that safety is not a problem anymore, and how this might relate to having cars almost completely removed from the get go.

There was however a discussion about how cars could be effectively removed from the streets without it being damaging for underprivileged groups of citizens that might need to rely on them. If these changes were to be enforced by taxation, it might end up in only the wealthier population having access to cars or other services of the like – which means it would only push inequality forward. Closing streets to car traffic might have the same effect, since it could eventually prompt more traffic in less affluent areas.

The scenario proposed could account for this, given that it suggests that the wealth gap is narrower than today – although the participants also commented on this being possibly the

most unrealistic part of the scenario. All in all, it was considered relevant to consider possible trade-offs that might come out of this restructuring of the system, lest they reinforce existing inequalities and so fail to achieve the goal of a more just and accessible mobility.

To account for and avoid this potential propagation of the current imbalance, the participants advocated for a participatory process that involves the people affected by the measures in the assessment of the situation, and lets planners and designers get to know the citizens they are designing for. This way, it would be easier to ensure that the right questions are being asked, specially taking into account the fact that mobility is a complex sociotechnical system, and trying to grasp the bigger picture might create some blind spots.

Figure 34. Women Workshop in progress I

3.3.4. Women Workshop

For the second workshop, all of the participants were women. Same as with the previous one, there is a variety of backgrounds but all of them are concerned with sustainability. It is relevant to note too that even though it was not a deciding factor when choosing the participants, the mixture of backgrounds is quite similar to the first workshop held, which helps the process of making them comparable to each other. Ages and backgrounds are summarized in the following Table 04.

Arantxa	26	Social Education + Development And International Relations
Marta	28	Fine Arts + Service System Design
Molly	23	Sustainable Design Engineering
Phuongdan	28	Sustainable Design Engineering
Siri	23	Industrial Design Engineer + Sustainable Design Engineering
Śliwa	26	Architecture + Sustainable Design Engineering

Table 04. Name + Age + Background Participants Women Workshop

When enquired about the modes of transportation they used, a similar pattern to the previous workshop. All of the participants had used their bicycles in the previous couple of days, combined with walking and public transportation – that is, metro and S-train.

The participants were introduced to the context of the thesis and the dynamics of the game. A small modification from the previous workshop was made, and in this one the participants were given a written scenario instead of having it read out loud by the facilitator, aiming to give them a clearer overview of the context they would be operating within in order to facilitate consistency during the workshop.

The participants were given some time to read through the text and ask for any clarifications they needed to – which were not significant for the process. The following paragraphs will convey the process of the workshop the same way it was done with the previous one.

NEWCOMER ROLE INTRODUCED – SIRI

First mobility needs are very practical – it mostly consists on figuring out how to get to the places that are going to be part of her daily life, so there is less flexibility. If she figures out a specific way to get to one place, she will probably stick to it for a long time, even if it is not the most efficient one. Challenges may be related to the fact that she still does not have a bike or a travel card, or a social circle to rely on.

SINGLE MOTHER ROLE INTRODUCED – ŚLIWA

"It takes a village to raise a child" – supposed I'm an established member of society who has a sup-port network – mainly friends and family, but maybe even neighbours. She can rely on her neighbours to watch over her kids.

What is the economic outlook of society?

When answering this question, it is relevant to note that the participants went extensively more into detail into the politics of the outlook of society rather than the economics – which might prove relevant when comparing the workshops. The participants propose – in line with the scenario they were presented with – an economic system not as dependent on growth as the existing one. It would rely heavily on a welfare system that would support the citizens and would lay a foundation that would keep people from going below the poverty line.

They suggest that citizens pay around 80% taxes, and that those would cover the following areas: green, climate adaptation and community projects, accommodation – although maybe not in its totality –, integration of newcomers – considering a big influx of climate refugees is to be expected, it would be necessary for e.g. language classes –, as well as ensure the self-sufficiency of local communities. It was also discussed that, given the future circumstances, possible conflicts would need to be dealt with.

The best option found in this regard was to have an organization such as the un, but "working properly". All in all, the money would be used to deal with uncertainties caused by the future climate situation.

Is mobility tightly or loosely regulated? Why and how?

Although at the beginning they state an intention of making mobility not tight nor loosely regulated, the model the participants came up with is quite rigid. In it, they decide to take as many motorized vehicles as possible out of the city and reduce their use as much as possible, except for some very specific situations that would need to be previously accounted for, such as the transport of larger goods. As for the rest of mobility, it would rely on electric public transportation and bicycles and the like, and in the need of using motorized vehicles, those would be provided by the state for the people to rent. Despite not talking directly about decentralization, they reflect about people not needing to move such longer distances and having their needs covered within their neighbourhoods. They also reflect upon the need for a change in habits and the current individualistic behaviours if society wants to strive towards a more sustainable future.

NEW MOTHER ROLE INTRODUCED – PHUONGDAN

She carries way more stuff with her now when moving around, including the stroller, so she has to rely on public transportation more than she used to. However, she plans on getting a cargo bike as soon as the baby becomes a toddler, as well as teach them how to ride a bike, because she consider it part of the health education of the child.

What role does gender play in mobility?

As expected – due to the fact that it is intrinsically related to the core of the thesis – the participants engaged in a lengthy and complex argument about the topic. Although the discussion about the role of gender was somewhat forgotten, they propose that it does not play a role because society would have reached equality – with gender not playing a role meaning that gender differences are accounted for rather than ignored. The main points that came up of it were related to the future system moving towards a more 'caring' system – which they related to the traditional idea of 'femininity', not necessarily agreeing with this association but rather recognizing that it a connection that would probably be drawn – that would focus on collective transportation and community.

They propose that the routes will not be standardized, but rather constantly adapted to the needs of the people using the system – "catering to the individuals while still serving the community" –, as well as a promotion of non-motorized means of transportation through education and culture, identifying them with both sustainability and health.

There was, however, interesting discrepancies about whether public transportation should be free for everyone or not, and who should be entitled to it. Although they agreed upon it at first – arguing that the high amount of taxes paid could cover for it – they quickly started discussing whether a 'valid' reason should be provided, with some still defending the initial free-for-all approach. What would exactly be a 'valid' reason, they did not specify.

What competences/knowledge do people need to have when moving around?

People should know where to go and how to get there – what options do they have, which might depend on what do they value most about their trip. Being familiar with the layout of the city or knowing how to use some kind of navigation tool would help in this case. They also should be able to know how to use those options, such as knowing how to ride a bike or, as the newcomer stated, public transportation usually works differently in different places and it can be confusing at the beginning. People should also be aware of social traffic rules that might be in place e.g. Cycling signalling rules or even the fact that you let people go out of trains before boarding. The participants also reflected on the fact that knowledge of basic maintenance of privately-owned forms of transportation should be common, due to the resource uncertainty.

What does mobility mean for the people?

Focusing this discussion around values, mobility being a right and representing freedom and independence were mentioned, as well as a dichotomy of it being a choice and something inevitable – a necessity. They also reflected on mobility coming with a baggage for climate refugees or people that have been displaced without choosing to do so. The single mother also mentioned it being a chore and a source of stress for her, being responsible for her and her children's mobility.

SENIOR WOMAN ROLE INTRODUCED – MOLLY

Maybe she has an e-bike for longer trips. Challenges might be bike getting stolen because it's a nice bike, or maybe even injuries because or her age. She loves moving through the city. She might be a bit slow so she hopes she's still able to move without being judged/harassed. She reflects on having a vehicle that allows her to be safer, which would demand for broader bike lanes, but there's also more space because they have less cars, so the car lanes could be used for bigger non-motorized vehicles as a 'slow lane'. Other challenge might be the changes in the system that she needs to get used to. Maybe she's part of a biking club.

From the introduction of this role an unprompted discussion about the average age of the population started. The participants recognised that it would probably follow today's trajectory, which would mean that people have less children, and so, there would be loss young people. They consider it interesting to provide educational programs for the youth so that they can find their place in this new society with an ageing population, given that the future society might design more about old people.

What does the living environment look like?

The city the participants propose has many more green and pedestrian areas, with wider sidewalks. After an extensive debate, they also concluded that taking advantage of the existing infrastructure – e.g. repurposing car lanes – would be better than building a new one. The participants also considered making the most of the bodies of water of the city, putting them to use for public transportation and in this way avoiding having to create a new physical network. There was also talk about the fact that the city would need to be adapted to the incoming climate changes, such as floods.

What do people eat and how is it produced?

In this question the participants proposed a future in which society would move towards a plant-based locally-grown diet. Education would be the main tool to achieve it, and more people would have their own gardens because they would know how to grow their own food. Preservation techniques would also be widespread, and food production should be combined with climate adaptation. Although technological solutions should not be relied on to deal with climate change, they could still be used to develop options such as vertical gardens.

SCHOOLCHILD ROLE INTRODUCED – MARTA

The girl mainly bikes and walks, because public transportation is still scary, even though she is getting better at it with the help or her parents and siblings.

TEENAGE GIRL ROLE INTRODUCED – ARANTXA

Biking and walking are her main modes of transportation, but she relies on public transportation if she has been out and should not be cycling. Society is more aware of the uncertainties that come with being a teenage girl navigating the city alone at night, and people look out for each other. There could be a figure – as it already exists in Denmark – that makes sure that people are safe at night. And also creating safe spaces. However, education would work towards not needing this.

After assigning the last role, the participants where enquired about what does mobility mean for them and what modes of transportation would they use in this future scenario. The answers are summarized in Table 05 below.

NEWCOMER	Uses mobility to explore her new area and visit the whole of the city and try out all kinds of modes.
SINGLE MOTHER	A chore and a source of stress, and she mainly uses public transport.
NEW MOTHER	Independence and peace of mind. Mainly walking and gradually biking as the kid grows up, but she might need to rely public transportation from time to time.

SENIOR WOMAN	It means independence and a way of keeping herself active, enjoying the city and meeting friends. Mobility would be an activity for her, using her e-bike and public transport, although she might need support.
TEENAGE GIRL	Freedom to explore the city and keeping a social life. Also, an identity associated with her bike and the way she moves around as well as how she wants to be perceived.
SCHOOLCHILD	Mobility is freedom and she would probably rely on her bike to be outside and meet with friends, probably will not think about anything else. It could also be a fun activity.

Table 05. What does mobility mean for them and modes of transportation do they use, Women's Workshop

Figure 35. Women Workshop in progress II

Do people feel safe when moving around the city?

People would feel more involved in their community, and they would be more educated, so they would reach out and look out for each other more, so it would be a safer scenario.

How well prepared is society for this future scenario? How probable do you think this scenario is? What obstacles might appear when trying to reach it? And how do you feel about this scenario you created?

Although the participants started the discussion by highlighting the fact that most of the topics they touched upon during the workshop are already relevant nowadays, the longer they talked about the scenario they painted the more sceptical they seemed about the possibility of it actually happening. They considered to be among the best-case scenario possibilities, and although they grant that people might come together in small communities, larger scale solidary seems too utopian for them.

Looking at the recent past, richer countries would probably not be willing to welcome climate refugees – and the participants do not trust the political class to be engaged enough to facilitate this process –, the infrastructure they conceptualized might be difficult to implement – decentralization has a limit after all – and although people will be more aware of climate impacts, there would probably still be some denial discourse about the impact humans have on the environment.As Covid-19 has shown, big crises tend to accentuate inequalities rather than easing them.

When looking at gender, they do think – and hope – that the situation will be improved as compared to today, but they still consider that it will not get as good as what they proposed.

In conclusion, they acknowledge that it is a realistic scenario, but only in the sense that it can be achieved within the proposed timeframe. However, they make an interesting point that in order to achieve it, decisions should already be taken and implemented to reach this scenario in 15 years. If the conversation is kept going as it is nowadays, there might be potential for it to happen, but at a slower pace.

The participants also commented on that they expected their vision of the future to be more negative than that of the other workshop, because of their perspective of the world today and the reality they live in.

3.3.5. Feedback

After concluding the workshops, participants were asked to provide feedback for improvement. This feedback was not implemented from the first to the second workshop for the sake of keeping them as comparable as possible – except for the suggestion of having the scenario printed out so the participants could read it themselves, as opposed to having the facilitator read it out loud for them – and was collected with the purpose of holding a third, mixed workshop later on in the semester. Also related to the scenario, they would appreciate visualizations of it, it does not matter whether it is an original illustration or a simple mood board – just something that provides a snapshot of the future.

As for the discussion, they proposed writing the assumptions taken along the workshop down, so that they could be held accountable when they propose something that opposes a previous hypothesis. Combined with this, they also suggested it could be that either the facilitator or one of the participants is assigned the role of note-taker, or that the worldbuilding is kept track of through post-its.

Related to the process of the workshop, they also note that even if the discussions were interesting, they would have liked to go through more of the questions – especially the mobility related ones – and so they suggest limiting the time allocated for worldbuilding, or narrowing down the scope of the questions.

Everyone stated that the find the inclusion of roles relevant, both to provide perspectives that otherwise might not be at the table and to generate new knowledge for the participants. It is suggested that the roles are included from the get go, or that people that actually embody those roles are invited to participate.

3.3.6. Strengths and weaknesses

These guidelines and development of these workshops were supposed to be as similar as possible in order to make them comparable to each other. The only adjustment that was implemented on the second workshop that makes it different to the first one was that the participants were given a physical statement to read, since it was considered that it would not affect the outcome of the workshop and would support the participants in better understanding the scenario.

Because of the way the questions were formulated and the dynamics of the game established, the discussion tended to stray from the original question. This is not necessarily a weakness, given that it led to touch upon topics that otherwise might not have been explored, but it led to the discussion sometimes forgetting about main axes of mobility and gender – and so it should be something to be dealt with when moving forward.

This project acknowledges that the sample of people that took part in the study might be biased because of previous knowledge on sustainability issues – however, rather than it being a weakness it considers it a strength, because it provides the participants with a broader understanding on the topic at hand and therefore allows them to make more meaningful contributions. Even so, moving forward and if this workshop is to be held outside of an academic setting, bringing people with more diverse backgrounds will most likely enhance the co-creation of knowledge.

Making separate workshops in which all of the participants identify as men or as women proved to be relevant, since it made it possible to observe the dynamics during the discussions and to elicit results that can be related to differences found in the literature.

The introduction of personas played a much bigger role than it was expected, with participants assuming their roles and interacting with each other without being prompted to. The possibility of them being more relevant in future workshops would be an interesting one to explore.

3.3.7. Comparison

The main differences and similarities identified during the workshop will be summed up in the following paragraph, however big or small.

- Men noticed very quickly that all the roles in the game were female, while women did not really comment on that.

- Both men and women got the cars out of the city as soon as they had the chance. However, while men relied more on technology to make things work, women went more into more detail about how would the logistics and technicalities of it exactly work and what it would entail. For instance, women engaged in a discussion about what to do with the emptied car lanes.

- Free public transportation was also quite promptly brought up by both groups. While men decided to have it very much from the beginning, women held quite a long argument about whether it should be free or not, and if so, for whom, under what conditions and so on.

- Both groups relied on decentralization of the city and building smaller communities to make this future work.

- As previously mentioned, the conversation tended to divert from the topic at hand. However, it did so

in different ways. While women tended to end up talking about politics when left to their own devices, men would rather go for and economics discussion.

- Women tried to be more consistent – which might have happened because of the change on how the scenario was delivered to them.

- Women were more radical when envisioning the changes in the future, but were also more concerned about the details of it.

- Although not directly a difference, it is necessary to acknowledge that the dynamics in each workshop might have been influence by the dynamics of the groups themselves, with men challenging each other's opinions more and more often, while women tended to tried to reach an agreement – with the exception of the public transport discussion.

Figure 36. Image of the board during the workshop

3.3.8. Future Workshop Design

Based on the feedback and the conclusions, the following modifications will be implemented if future workshops were to take place.

- There will be an initial round in which the participants will go through the worldbuilding questions and give individual answers. Whoever gets the question gets to decide in that particular area, as long as it does not contradict the previous answers.

- Each question in this round will have a limited time to be answered, still to be defined.

- Roles will be introduced after this round and assigned randomly as before. In this way, worldbuilding will not be biased.

- Mobility questions will be answered next, following the same dynamics as before, and allowing for more reflection.

- The participants will be encouraged to keep track of their answers. Rather than assigning a notetaker role, they will need to physically represent each of the answers they give, at least in the worldbuilding round. This can be done through a word, a drawing or whatever else they deem appropriate.

- Even if technically not needed for this redesign, the board will be kept as it successfully achieved its purpose.

3.4. MAPPING THE PRACTICE OF THE FUTURE

For the mapping of the possible future practice of mobility, the knowledge gathered and generated through the Expert Interviews as well as the Workshops will be implemented.

As a disclaimer, it should be noted that this depiction – as well as the previously related to the current practice – create a general overview of the practice. Despite this, it would be possible to 'zoom in' in different elements of the practice, which would uncover another, more specific related to e.g. one of the materials. This layered nature of practices should be kept in mind so as to not get stuck in the bigger picture.

Figure 37. Mapping of the future practice of mobility, based on Shove et al. (2012)

As it can be seen in Figure 37, most of the competences remain the same; however, the materials and meanings they ascribe to, do change. Not necessarily in essence, since most of them are still the same ones as in the current practice, but definitely in relevance.

Non-motorized vehicles as well as the bodies of people would gain importance, complemented by public transport and an infrastructure that no longer focuses on cars as the main means of transportation.

In this future vision, the value of the meanings would be highlighted, with those related to sustainability carrying greater weight. The meaning of these meanings might actually change, with for instance time being perceived differently – not as a resource but rather as something to be enjoyed. In most of the cases, these meanings shift around the fact that, in the possible new mobility paradigm, mobility is not something people need to do – and therefore, it stops being a chore – but something people choose to do, which opens for this possible reshaping of values. Effectiveness as the main goal gets re-evaluated, and the system as a whole would get redesign around these meanings.

Through the Expert Interviews and the Gamified Workshops, it was possible to get a glimpse into what a more gender-aware perspective of sustainable mobility would entail.

The vision of the experts on the matter is quite unified. Their understanding aligns with most of the findings of the literature – an expected outcome, given that the size of the field of research that aims to draw a connection between gender and sustainable mobility beyond data collection is not that large, and in some cases, it is their own that were depicted in the literature review. They state that the link between gender and mobility is clear, but what is not so straightforward is what is the cause and what is the consequence in that link – which would be an issue worth studying further.

Their reflections are mainly centred around the need to bring gender – and all the dimensions that come from an intersectional perspective on it – forward in the sustainable mobility discussion, in order to have a complete picture of people's needs and concerns – not just those of half of the population. The general reluctance in the Danish context to tackle this issue only adds to the pertinence to do so. And so, it is necessary to educate relevant stakeholders into adopting this perspective, so that the outcome of the design encompasses this perspective. However, it is important to bear in mind that by bringing gender and gender roles into the conversation, the design might end up reinforcing existing inequalities instead of erasing them.

As for the workshops, they were an insightful glimpse into how to engage people into considering gender when talking about mobility and sustainability, the awareness they might have to their own blind spots, and the process they followed to build upon each other's knowledge.

A reproduction of what the literature considers traditionally associated with gender roles can be observed in the participatory process – with the men more keen on discussing economics and technology, while the women's conversation tended to develop into political considerations. Awareness about the role gender plays – or might play – into building a new, more sustainable mobility system could be discerned in both groups, and despite the difference in dynamics, some common points of agreement were reached. These will be presented and reflected upon in the following section.

This overview allows for a thorough mapping of what the practice of mobility would look like in the future system. It is acknowledged in both the interviews and the workshops that – while the competences would keep being quite similar – the materials together with the meanings would need to change. The shift in regards of the materials would be concerned with what – or rather, who – does the system care about, and would bring to the forefront the need for caring for the vulnerable bodies that move around. As for the meanings, some of them might align with the ones present in the current system. However, there would need to be a change on the mobility paradigm is perceived, one that entails a bigger emphasis on the values, and those values being to the service of the people that ascribe them and not vice versa.

4. Delivery

In this last section, the project, its strengths and its limitations will be discussed, along with the contribution it makes to the field of Sustainable Design Engineering. A final discussion and a vision for further studies will also be laid out.

4.1. DISCUSSION

Having reached this point, the original research question and sub questions are stated again.

What could a feminist mobility system look like?

Why do women have more sustainable practices?

Can feminist design theory and design for sustainable transitions build upon each other?

Firstly, the author wants to acknowledge that while the project set out to define a conceptualization of a feminist mobility system by implement Feminist Design Methodology within the Sustainable Transitions framework, the final result did not quite turn out that way. And so, a final subtitle was added to the research.

A reflection on the role feminist design can play within radical sustainability transitions

This thesis serves as a reflection on the process of trying to combine the previously mentioned methodologies, and how, aided by practice theory, it can build knowledge and educate relevant stakeholders in the project.

Through the workshops it was observed that, when brought to the centre of the discussion, gender awareness not only helps create more sustainable solutions and practices but also facilitates the discussion and inclusion of other often-forgotten topics related to diversity, such as age, race or ableness. Although this is nothing new, it still is an issue that keeps being forgotten by institutions and sometimes even researches.

Gender-inclusive – or rather, gender-aware – policies are more and more common nowadays, even in Denmark where the idea that equality has been achieved and therefore not necessary to talk about is widespread. However, these policies usually suffer from the same ailment sustainability ones do – they are often regarded as an add-on or an afterthought, not as a characteristic that belongs to the core of the intent.

The final aim of this thesis is then to contribute to the process of enabling taking gender into consideration from the start, giving voice to silenced concerns in an attempt to democratize the future practice of mobility.

4.1.1. Limitations of the study

As for the limitations of this thesis, looking back the project would have definitely benefit from having more than one person working on it, so as not to lose perspective, as well as helping with the discussion and reflection phases of the project.

It is also acknowledged that the study only contains one data point for each gender, as it was only possible to hold once workshop with each for the data collection.

It would also be interesting to see what the process and the results of the workshop would be if a mixed group of participants were to be brought on board.

A bigger timeframe would have enabled for a deeper literature review on the methodologies explored, making it possible to create a conjoined framework from the beginning.

4.2. CONTRIBUTION TO SUSTAINABLE DESIGN ENGINEERING

The project presented in this report was developed as a Master Thesis of the Sustainable Design Engineering Master at Aalborg University in Copenhagen. The field of Sustainable Design Engineering as well as the profession of Sustainable Design Engineer are fairly new, and aim to take a transdisciplinary approach by merging technological studies, social science and design practices with a sociotechnical radical approach.

As part of an emerging field of research which body of knowledge is still growing, it is important for this thesis to acknowledge the direction in which it is helping the field move towards.

To do so, along the following lines the project will be placed within the Design for Sustainability innovation framework defined by Ceschin and Gaziulusoy (2019), making it comparable with others in the field and allowing to map out its framing and scope. This framework was developed as a way of synthesising the field of Design for Sustainability and its evolution form a focus in products and technologies to a more system-focused approach.

In this project, the aim was to innovate at a sociotechnical level, promoting a radical change in the mobility paradigm by looking at it through a gendered lens. Even though – as stated by the literature – different cultures of mobility force designers to look at very context-specific solutions to enable this radical change, its scope is still systemic. Interventions in local communities informing and involving relevant actors to develop a more feminist mobility system will create the momentum needed to foster radical change in the socio-technical system. The situation with the framing of the problem is as well very similar. Definitely human centric, it does not aim to make a more sustainable system through technology, while grounding itself in community practices to then bring about change in socio-technical system dynamics.

The inclusion of Feminist Design Methodology aims to bring the gender discussion to the forefront as something essential to sustainability – somewhat similar to what it is being attempted to do with sustainability in the bigger context.

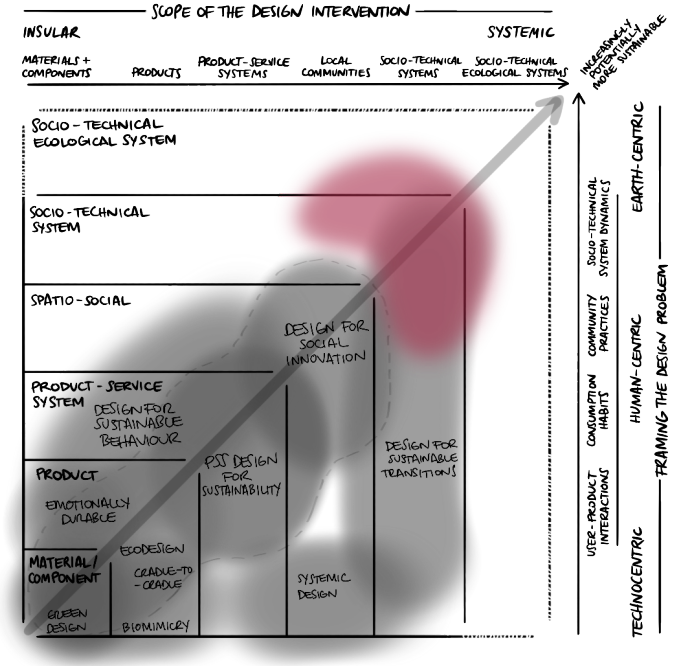


Figure 38. Positioning of the project within the Design for Sustainability innovation framework (Ceschin and Gaziulusoy, 2019)

4.3. REFLECTION

Once last time, the final research question is stated.

What could a feminist mobility system look like? A reflection on the role feminist design can play within radical sustainability transitions

This thesis aimed to approach sustainable mobility as defined within the Six Transformations framework (Sachs et al., 2019) from a gender perspective, and by doing so, contributing to the field of Sustainable Design Engineering by laying the foundations that would enable future designer to build upon the ground that Feminist Design Methodology (Baker, 2018) and Design for Sustainability (Ceschin and Gaziulusoy, 2019) share. To do so, it has relied on Practice Theory (Shove et al. 2012) and Participatory Design, as well as many other theories and methodologies that have been part of the curriculum of the Sustainability Design Engineering Masters at Aalborg Universit.

Although the project has not quite reached the initial objective of creating a vision of what this feminist mobility could look like, the author believes it still serves as a reflection on the relevance Practice Theory and Participatory Design have on building new knowledge. It also highlights how, by looking at the meanings women ascribe to the mobility practice, and using that knowledge as a base on the involvement of the local communities in the design process, radical change within socio-technical systems can be initiated.

4.4. WHAT COMES NEXT?

The author believes this avenue of work towards social sustainability to have great potential to address issues of inequality and inequity, and so, would like to propose a possible future course of action.

- A final workshop will be held, in hopes of gathering more qualitative data that can help evaluate and contrast the previously obtained in the workshops described in this report.

- Said workshops will be held with a mixed group of participants, and the aim is to use it as a final proof of concept that may give perspective on the interactions between the people involved.

- Further research from a theoretical perspective on how do the fields of Feminist Design Theory and Design for Sustainable Transitions intersect and interact would be of value in pushing both agendas forward and carving a path for future designers to follow.

- Data gathering in this regard is also of the utmost importance. Bigger and better qualitative and quantitative knowledge is needed for researchers to work on it. Especially important in this regard would be to collect information on practices, to map values and motivations.

- Practice Theory was used as a tool in this project in combination with Participatory Design, but it could be interesting to see what the outcome would be if other frameworks such as Planetary Boundaries or The Six Transformations were used.

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