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Incorporating Sustainability into Innovation Methodologies

A qualitative case study on how the climate innovation program 20tretti combines Design Thinking and Systems Thinking to foster sustainability-oriented innovations

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Abstract

The impacts of climate change are becoming more and more visible to the society as a whole and consequently, sustainability has increased its importance and relevance. To overcome climate challenges, innovation is a crucial tool. However, many of the existing innovation methodologies are not able to consider sustainability aspects due to their user-centered focus and priority to solve current problems.

This thesis aims to investigate how a combination of the holistic systems thinking approach and the well-adopted design thinking philosophy may contribute to more sustainability-oriented innovations. The climate innovation program *20tretti*, initiated by StartupLab, has applied this combined methodology and engaged Norwegian corporates and ambitious startups to collaborate.

The objective of the research is to examine how the innovation methodology influences the probability for startups to successfully deliver sustainability-oriented innovation to the market. Moreover, the study is a qualitative case study based on semi-structured interviews with participants in the program. In total, eight interviews have been conducted and form the analysis and conclusion of our thesis.

We find that system thinking effectively contributes to identifying and prioritizing climate challenges related to the corporates' operations. The design thinking component is less prominent, as most startups were already quite mature with well-developed prototypes before the participation. Further, we find that corporate-startup collaboration is a powerful platform to boost sustainability-oriented innovations, especially for startups that need to test and validate their solutions in larger volumes.

Keywords – Sustainability-Oriented Innovation, Corporate-startup collaborations, System Thinking, Design Thinking

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1 Introduction

During the last decades, the attention and concerns about climate change have increased around the globe (Searle and Gow, 2010; Kvaløy et al., 2012; Patrick et al., 2021). More rapid occurrences of extreme weather, droughts, and floods have made the consequences of global warming more visible to the global society (Stanford University, 2020). As a result, people are raising their voices to put pressure on policymakers and businesses to take action (Kraemer, 2021; Quackenbush, 2022).

Due to new regulations from policymakers and pressure from shareholders, stakeholders, and investors, companies are being forced to take sustainability into consideration in their operations and long-term strategies. In fact, as much as 90 percent of the world's largest companies issue sustainability reports (KPMG, 2017). Furthermore, companies are increasingly applying sustainability indicators in their traditional performance criteria and consider sustainability as a key driver for innovation (Gaziulusoy, 2015).

To overcome the climate crisis challenges, innovation is crucial. For instance, the EU has singled out innovation as one of the key drivers to enable the commercialization of new renewable energy sources and advanced material technology (The European Commission, 2020, 2022). Moreover, the United Nations emphasizes the promotion of innovation in their ninth Sustainable Development Goal, *Industries, Innovation and Infrastructure* (UN, 2022).

However, innovation methodologies do often draw from design thinking toolkits, a user-centered technique where the human needs are put in the center (Roth et al., 2020; Carlgren et al., 2016). In general, it is a natural approach to develop products and services that effectively meet market demands. On the other hand, there are other aspects than user needs that must be considered when developing contributing solutions to the climate crisis. Unfortunately, sustainability-oriented innovation methodologies are also typically based on the same user-centered approaches with challenges of incorporating sustainable aspects in the innovation processes (Wilkerson and Trellevik, 2021).

Nevertheless, new methodologies within sustainability-oriented innovations are being developed, such as a combined methodology consisting of the holistic systems thinking approach and the well-adopted design thinking philosophy. The climate innovation

program 20tretti, initiated by StartupLab, has applied this combined methodology and engaged Norwegian corporates and ambitious startups to collaborate (StartupLab, 2022a).

In this master's thesis project, we will study the innovation methodology that the 20tretti program applies, which leads us to our research question.

1.1 Research question

Our research question is as follows:

How does the innovation methodology, that the 20tretti program applies, influence the probability for startups to deliver sustainability-oriented innovations to the market?

The definition of sustainability-oriented innovation will be further described in section 2.3.3. Our research question covers several elements and in order to answer it appropriately, we have divided it into three sub-questions, which can be seen as a step-wise approach to answer.

1. Has there been delivered, or is it expected to be delivered, more sustainable innovations to the market as a result of the 20tretti program?
2. To what extent is the theory behind the innovation methodology responsible for more/less innovations?
3. To what extent is the practical application of the innovation methodology responsible for more/less innovations?

As presented in sub-questions two and three, we have studied the innovation methodology from two perspectives: theory and practical application. By theory, we refer to the combination of design thinking and systems thinking, while the practical application refers to corporate-startup collaborations. The innovation methodology, which is the point of interest in our thesis, will be further described in section 2.3.4.

Several parameters influence the probability for startups to deliver innovations to the market. By examining the theory and the practical application independently, we believe that we can more precisely assess the actual impacts of the innovation methodology.

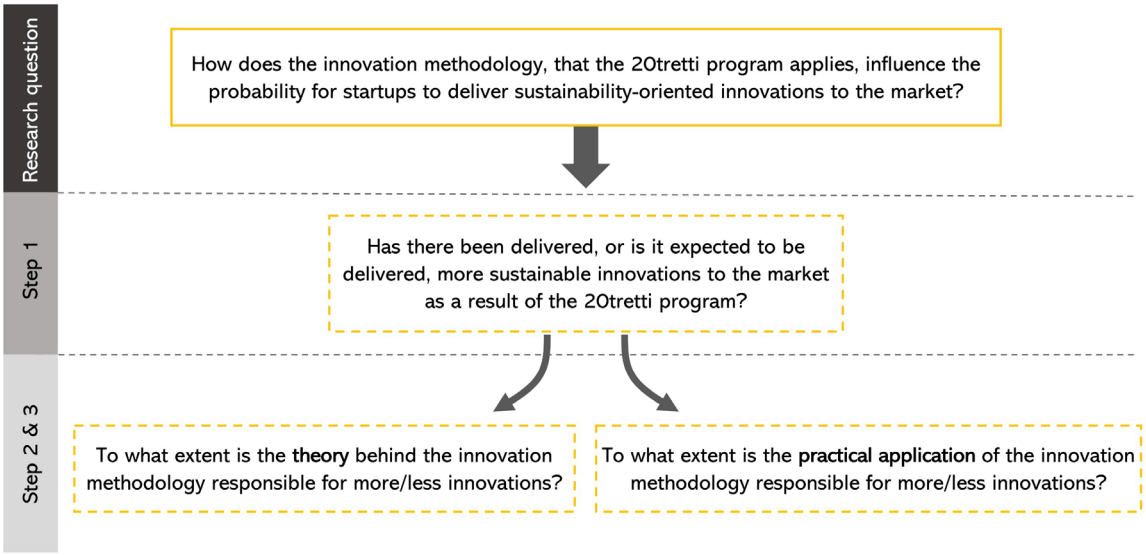

Figure 1.1: Research process.

1.2 Hypothesis

Moreover, we have conducted the following hypothesis:

> *If the innovation methodology incorporates sustainability well, there is a greater probability for startups engaged in the 20tretti program to successfully deliver sustainability-oriented innovations to the market, than startups not engaged in the program.*

As described above, the probability of more sustainability-oriented innovations will be examined through startups' possibilities to successfully deliver their products or services to the market.

Moreover, we are aware that many factors influence the probability of startups successfully launching their products or services in markets, such as timing, access to capital, market trends, and economic downturns. However, our research has tried to keep other factors constant and specifically focused on the innovation methodology.

1.3 Thesis structure

After the introduction, chapter 2 will present the context of our thesis and introduce StartupLab and the 20tretti program. In addition, it clarifies our definition of key terms and presents the literature review. In chapter 3, the theoretical framework will be given.

The theory on which 20tretti is built, design thinking and systems thinking, will be described, as well as the theories of sustainability-oriented innovations. In chapter 4, our research method will be presented, including the most optimal research design and our chosen research design. Chapter 5 will outline the findings from the conducted interviews with participants in 20tretti. Further, chapter 6 will discuss our findings and apply them to the theoretical and practical context. Finally, chapter 7 provides the final, concluding remarks of our study.

2 Background

This chapter outlines the background of our thesis. StartupLab and the 20tretti program will be presented, as well as our definitions of innovation, sustainability and sustainability-oriented innovations. Also, we will further clarify the meaning of 'the innovation methodology' which will be frequently used in the thesis. Lastly, a literature review will be presented, emphasizing the lack of research within the field.

2.1 StartupLab

StartupLab is an incubator and early-stage investor for Norwegian technology startups. The company was established by Alexander Woxen and Oslotech in 2012 and has since then been growing to become Norway's largest tech-incubator (StartupLab, 2022c). They have supported more than 400 companies, where around 75 % of them are still growing (StartupLab, 2022d). On the list of StartupLab alumni companies, we find successful public-listed companies such as Kahoot, Huddly and ReMarkable.

StartupLab has partnered up with 25 large Norwegian companies, such as Equinor, DNB, Statkraft, and Telenor. The purpose of these partnerships is "to increase the likelihood of success for young companies and at the same time help large companies innovate faster" (StartupLab, 2022e). Hence, the partnerships have a two-sided mission. Firstly, the startups benefit from the partners' network through competence sharing and expertise services. As most startups at StartupLab are B2B companies, it is not unusual that they find their first customer within the partner network. Secondly, by collaborating with ambitious tech startups, the partners get access to new ideas and technologies and can trigger startups to deliver products and services that they need. As part of the partnerships, StartupLab is expecting partners to be engaged and interact with the startups to see if there exist potential business opportunities that they both could benefit from (StartupLab, 2022e).

The most considerable part of StartupLab's total income comes from the partners' financial support. In general, the support is sufficient to cover the operational expenses, and it is therefore not necessary for StartupLab to use the income from memberships to operate their business. StartupLab aims to minimize the membership price as far as the fee covers

costs such as office supplies, equipment, and power (Å. Aarø, personal communication, 26.01.2022).

There are mainly three programs that startups can apply for. Firstly, the most common program is the Incubator program, where startups pay a monthly membership fee and get access to office facilities, workshops, legal and accounting services, mentors, and data science labs. Participants in this program usually sit for 12 months but can stay longer if they wish and StartupLab finds it necessary. Furthermore, StartupLab also offers a three-month program where the participants, without any program fee, receive funding and close follow-up from dedicated members of the StartupLab team. At last, StartupLab offers a third option for startups needing funding and not necessarily incubator services (StartupLab, 2022e)

In order to help startups get off the ground, StartupLab is investing 1-3 million NOK in the first equity rounds in all of the described programs above. In return, StartupLab asks for a 5-15 % equity share and holds the position until the startups have grown out of size. To avoid taking too much control of the startups' management, StartupLab usually does not take any board seats unless the startup wishes it. (StartupLab, 2022f)

The investments are made on behalf of the Founders Fund, a fund initiated by StartupLab and a group of successful entrepreneurs. The majority of the investors are alumni entrepreneurs that, as StartupLab states, "are all triggered by the idea of getting ambitious talent off the ground" (StartupLab, 2022f). In addition to a potentially high return on investment, the investors get access to insights and an extensive network of entrepreneurs.

Simply put, the partners are financing the everyday operation of StartupLab, while the Founders Fund is funding the development of the startups through investments. This business model has proven to be solid and less dependent on public financing supporting schemes, which other incubators are more dependent on (Å. Aarø, personal communication, 26.01.2022).

2.2 20tretti: a climate-oriented innovation program

20tretti is a climate-oriented innovation program initiated and developed by StartupLab. As StartupLab states, the program aims to "initiate pilot projects between startups and

corporations to accelerate the green shift" (StartupLab, 2022a). The program is a fairly new concept and was held for the second time in 2021, which forms the basis for our thesis (StartupLab, 2022b).

The fundamental idea of 20tretti is to let large companies define climate challenges related to their business and then engage startups to propose solutions to these. Hopefully, the program will result in fewer climate hazards in society and more sustainability-oriented innovations delivered to the market.

In the following sections, we will describe the process of last year's 20tretti program. To clarify, large companies are addressed as partners, while startup companies are addressed as startups.

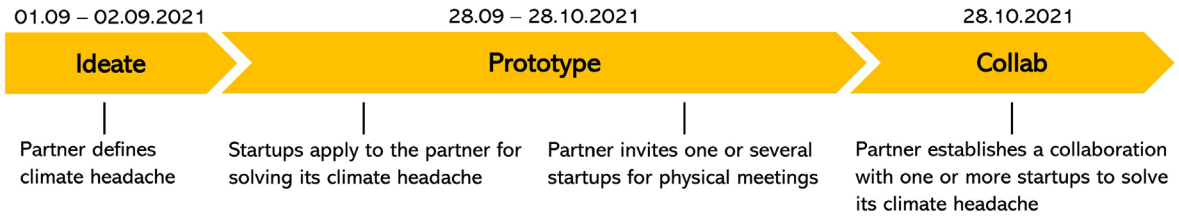

Figure 2.1: The process of 20tretti

The program started with a problem definition phase for the partners participating. This phase was called *Ideate* and was held in Bergen from 1 September to 2 September 2021. StartupLab used its broad network to engage large companies to participate in the program, such as Posten, Equinor, and DNB (**?**). In total, 19 companies participated with 1-4 attending employees per company. The workshop's goal was to let partners define their climate challenges, conceptually called climate headaches. During the *Ideate* workshop, StartupLab introduced the partners to systems thinking philosophies and guided them through a systems mapping analysis to identify environmental externalities and impacts. After the analysis, the findings formed the basis of their definition of climate headaches. Further, the climate headaches were described thoroughly and published on StartupLab's websites to enable startups to apply for them with their proposed solutions (StartupLab, 2022a).

The next phase was called *Prototype* and lasted from 28 September to 28 October. In this phase, startups were free to apply for the partners' climate headaches. Some were also invited to StartupLab to get guidance on tailor-making their solutions to fit the

corresponding climate headache. During the *Prototype* phase, partners established contact with promising applicants and selected the ones with the most promising solutions. Then, the selected startups were invited to take part in the last phase of the program, *Collab* (StartupLab, 2022a).

The goal of *Collab* was to establish collaborations between the participating partners and the selected startups. Most startups met with their matching partner for the first time and discussed the possibilities for a collaborative project. In addition, startups pitched their proposed solutions to the respective climate headaches to all partners attending (StartupLab, 2022a). At last, partners chose one or several startups to collaborate with and signed a letter of intent to formalize a binding agreement. In total, 20tretti established 15 collaborations.

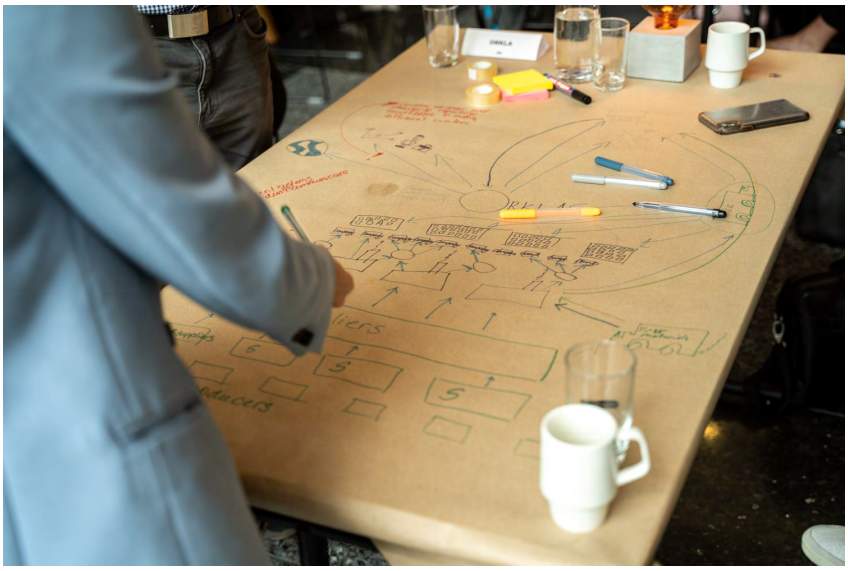

Figure 2.2: Photo from the systems mapping analysis at the *Ideate* workshop September 1st 2021. *Photo: Stig Helle*

2.3 Innovation and sustainability

2.3.1 Definition of innovation

Innovation is everywhere today. You find it in organizations, both in their vision, mission, and objective statements. Politicians regularly mention it in speeches. Manager titles such as Chief Innovation Officer are becoming more common in organizations, and at universities, innovation centers are popping up (Kahn, 2018). In other words, the term

has gathered a lot of attention, and thus, different understandings of it have emerged.

Oxford defines innovation as "the introduction of new things, ideas or ways of doing something" (Oxford University Press, 2022a). In The Little Black Book of Innovation, innovation is defined simply as "something different that has impact" (Anthony, 2011).

Furthermore, Ottinger (2021) outlines four different ways of innovation:

- Disruptive innovation, which is a new business model or technology that disrupts an existing market.
- Incremental innovation, a gradual, continuous process to improve existing products and services.
- Sustaining innovation, which is about improving an existing product, aiming to sustain the position in the existing market.
- Radical innovation, a technological breakthrough that transforms industries, often creating a new market.

Kahn (2018) defines innovation by distinguishing between three different categories of innovation: innovation as an outcome, innovation as a process, and innovation as a mindset.

Innovation as an outcome is about what the innovator wants to happen, focusing on the actual result of the innovation. Innovation as a process is how innovation is organized to realize these outcomes. At last, innovation as a mindset is about internalizing an innovative mindset within the members of the organization (Kahn, 2018).

Our thesis focuses on the outcome part of innovation which Kahn (2018) segments into the following: product, marketing, business model, supply chain, and organizational innovation. It is product innovations we aim to examine. More precisely, this master thesis project defines innovation as a new product or service delivered to the market at a commercial scale. Moreover, as illustrated in figure 2.3, we focus on the end goal and consider developing products or services as innovations the moment they have become successful in a market.

For clarifications, figure 2.3 simplifies an innovation process to illustrate our definition of innovation. We distinguish between prototypes and Minimum Viable Products (MVPs), which are terms being used by the respondents of our research. A prototype is the

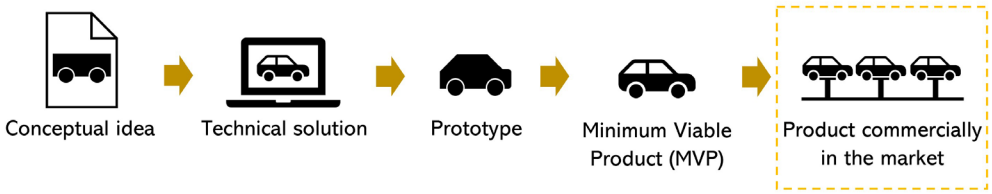

Figure 2.3: Our definition of innovation

first functional draft of a product or service that aims to test an idea or a hypothesis. Commonly, it is a low-engineering item with limited functionalities. On the other hand, an MVP is a more usable version of a product or service with the main features and functionalities available. It aims to test the product and receive valuable feedback (Surdy, 2021). Moreover, there are several developing phases following an MVP, such as Minimum Business Increment (MBI), Minimum Marketable Feature (MMF), and Minimum Marketable Release (MMR) (Ambler et al., 2017), but for simplicity, we will not elaborate on these.

2.3.2 Definition of sustainability

Sustainability has existed for a long time, with its roots tracing back as far as the German mining administrator, Hans Carl von Carlowitz, in the 17th century (Environment Society Poral, 2022). The German used the term in the essence of the long-term use of natural resources in forestry in 1713. However, sustainability as a concept did not increase its significance until the second half of the 1900s, when the attention to global environmental challenges grew among societies.

The United Nation's World Commission on Environment and Development, known as the Brundtland Commission, highly influenced the modern understanding and use of sustainability in its mission to unite countries to pursue sustainable development (Brundtland, 1987). In the commission's report, sustainable development was defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (Brundtland, 1987). This definition laid the basis for how people and businesses understand sustainability today. Moreover, member states of the UN adopted the Sustainable Development Goals in 2015 to unite all countries in a joint call for sustainable action. The goals consider all aspects of sustainability, including poverty, peace, health, climate, and so on (United Nations, 2022).

Furthermore, John Elkington coined the term Triple Bottom Line (TBL) in 1994, which proposes that companies should measure their results in three different aspects: social, environmental, and financial (Elkington, 2018). Another way of phrasing the TBL aspects is people, planet, and profit. People refer to the companies' social responsibility, planet to the environmental impacts and profit to a responsible financial performance. All these aspects are vital parts of sustainability. Our thesis focuses on the environmental aspect of sustainability, or more specifically, the climate aspect.

2.3.3 Definition of sustainability-oriented innovation

As our definitions of innovation and sustainability are explained, we also find it essential to emphasize our definition of sustainability-oriented innovations. Thus, by sustainability-oriented innovations, we address new products or services that aim to solve climate challenges and are commercially delivered to the market.

Further, we do not distinguish between sustainable innovations and sustainability-oriented innovations and stress that these two terms will be applied for the same purposes.

2.3.4 The innovation methodology

The term 'innovation methodology' has already been touched upon in chapter 1, and we will shortly clarify our meaning in this section. The theories linked to it, design thinking, systems thinking, and sustainability-oriented innovation, will be elaborated more in detail in chapter 3.

To begin with, a method may be defined as a systematic procedure carried out to accomplish something. In other words, it is a way to do something according to a plan to achieve a preferred outcome (Porumboiu, 2021). Thus, in the context of innovation, an innovation methodology is a practical way to achieve innovation.

There are many ways to achieve innovation and, consequently, many innovation methodologies. One of these is design thinking, a philosophy and innovation approach used to tackle many problems of the world throughout the last decades (Galera and Borzaga, 2009), with its roots going back to the 1960s (Arnold, 1959). The most common design thinking approach is a five-step iterative process where the targeted user or user group is put in the center of the development, with rapid testing and prototyping. This

approach has shown to be an effective way to develop market-relevant products or services (source). Still, it has also been criticized for being unambiguously focused on the user with a narrow problem framing and not able to incorporate other aspects such as sustainability (Wilkerson and Trellevik, 2021).

Another innovation methodology is systems thinking, a holistic innovation approach that focuses on how constituent parts in a system interrelate and work over time (Lutkevich, 2020). There are several techniques within systems thinking, but seeing a problem and its externalities as part of a greater system is common for all. Attention has been drawn to systems thinking techniques having the properties to connect elements to the bigger picture and thus the capabilities to incorporate challenges regarding sustainability (Lezak and Thibodeau, 2016; Davis and Stroink, 2016).

The innovation methodology we have studied in this research project is a combination of these two mentioned methodologies. Systems thinking techniques are applied in the first phases of design thinking to place the problem or need into a larger societal context, as illustrated in figure 2.4. In this master thesis project, we stress that it is this approach we address by 'the innovation methodology'.

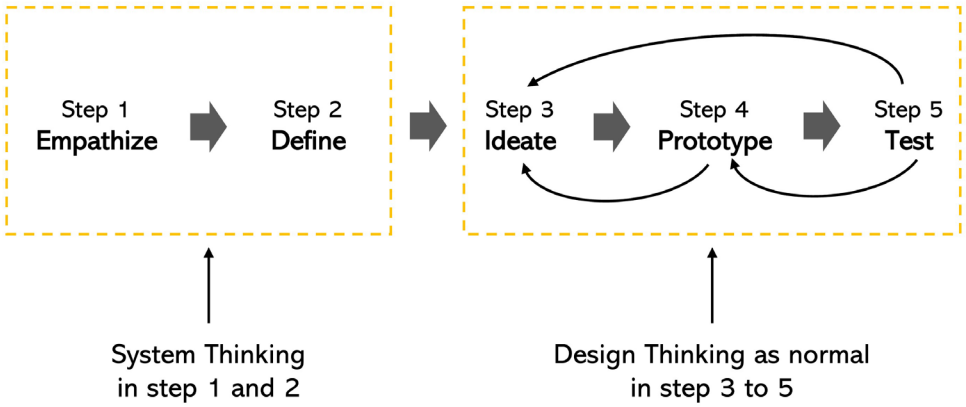

Figure 2.4: Implementing Systems Thinking in step 1 and 2 of the Design Thinking Process.

Furthermore, we distinguish between the theory behind the innovation methodology and the practical application of the innovation methodology. By the theory, we mean the combined model of design thinking and systems thinking explained above, while the practical application addresses how 20tretti applies the innovation methodology. Specifically, the practical application is the corporate-startup collaborations that

StartupLab has facilitated. A combination of systems thinking and design thinking can be applied in several contexts, and cooperation between startups and corporates is only one of them.

Moreover, differentiating between the design thinking component and the systems thinking component in 20tretti is not obvious. Therefore, we stress that systems thinking is most implemented in the 20tretti program since the participants used systems mapping to define their climate headaches. However, design thinking techniques become more relevant in later product or service development phases after the problem framing. Therefore, it has been pertinent to study design thinking's role in assessing the more long-term effects of 20tretti.

2.4 Literature review

Incorporating sustainability into innovation methodologies is not a novel phenomenon. Especially since the Brundtland report launched the concept of sustainable development in 1987, theories and concepts such as Sustainability-Oriented Innovation have emerged (Klewitz and Hansen, 2014). However, some researchers have been addressing the challenges with user-oriented innovation methodologies not being designed to take sustainability into account (Hjalmarsson and Lind, 2011; Hoolohan and Browne, 2020). This section will provide a review of the key literature that touches upon our field of research, namely how a combination of systems thinking and design thinking may foster sustainability-oriented innovations. For clarification, the terms and theory of design thinking, systems thinking, and sustainability-oriented innovation will be explained more in detail in chapter 3.

Buhl et al. (2019) emphasize the value of using design thinking to foster the development of sustainability-oriented innovation (SOI). They argue that the multidimensional character of SOI makes it difficult for companies to develop such innovations (Buhl et al., 2019). Thus, Buhl et al. (2019). state that there is a need for adequate methods and tools to facilitate successful development of SOI and suggest that the user-centered problem-solving approach of design thinking tackles this need.

Although the existing scientific literature is relatively minimal, there is some literature on the combination of systems thinking and design thinking. On a more general basis, Richard Buchanan has studied how this combination could improve the principles for the

world we are making. More explicitly, he emphasizes that design thinking engenders the specificity and the user-centered perspective that system thinking lacks (Buchanan, 2019).

However, Buchanan does not narrow his research to either innovation specifically or sustainability. In fact, there is not very much scientific research on how a combination of systems thinking and design thinking could develop sustainability-oriented innovation methodologies. Still, there is one particular research article that should be mentioned as an influential part of our master thesis project.

Wilkerson and Trellevik have conducted research in collaboration with the 20tretti program in 2020, where they studied how combined systems thinking and design thinking approaches could improve the problem definition of SOI (Wilkerson and Trellevik, 2021). Their work has laid the basis for our research, and as a result, this master thesis project is in many ways a continuation of their research, despite some dissimilarities.

While Wilkerson and Trellevik's main object was to enhance the problem framing of the innovation process, we have tried to assess the more long-term effects of the innovation methodology. As our research question states, we aim to determine if the innovation methodology increases the probability of startups delivering sustainability-oriented innovations to the market. Thus, we have put the methodology into a long-term perspective and studied its direct and indirect impacts on the development, upscaling, and commercialization of products and services.

Furthermore, Wilkerson and Trellevik tested the innovation methodology in two settings: a sustainable innovation course for students and business participants in 20tretti. Our research narrows the test platform by only focusing on business participants in corporate-startup collaborations.

To our knowledge, no one else has been looking at the mentioned combination of methodologies in the context of sustainability-oriented innovation. Therefore, we consider our research a valuable contribution to the scientific literature.

3 Theoretical framework

This chapter will present the theoretical framework of our thesis. First, we will present different approaches to design thinking and its criticism. Secondly, systems thinking theories will be presented, including the systems mapping techniques and the theory's challenges. Them, sustainability-oriented innovations will be described. At last, the combination of these two theories will be elaborated.

To begin with, we find it natural to provide a brief, contextual introduction to place our presenting theories into a larger innovation landscape.

One common distinction in the innovation landscape is closed innovation versus open innovation. During most of the 20th century, the innovation was generally so-called closed innovation (Henry W. Chesbrough, 2003). Typical characteristics of closed innovation are that the company believes that the smart people in the field work for them, that if they make a discovery, they will reach the market first, and if they are first to commercialize an innovation, they will win. Also, controlling the intellectual property is key in closed innovation in order to make sure that their competitors don't profit from their ideas (Henry W. Chesbrough, 2003).

Closed innovation worked well during most of the 20th century. However, towards the end of the 20th century, several factors contributed to a reduction in closed innovation and the introduction of open innovation. The most important factor was perhaps a big rise in the number and mobility of knowledge workers, which made it more difficult for companies to control their proprietary ideas and expertise (Henry W. Chesbrough, 2003). The growing availability of private venture capital was another important factor, as it helped finance new companies and their efforts to commercialize (Henry W. Chesbrough, 2003).

Typical characteristics of open innovation are the belief that not all the smartest people in the field work for your organization, the company doesn't have to originate the research in order to profit from it, and that the company will win if they make the best use of both internal and external ideas. Regarding intellectual property, they believe that they can profit from others' use of their IP and that they can buy others' IP when it's beneficial for them (Henry W. Chesbrough, 2003). Open innovation opens up for a user-centered approach to innovation, where the customers are a part of the development of new products

and services. Design thinking, which will be presented in the next section, is an example of an open innovation method.

3.1 Design Thinking

"Design thinking is a non-linear, iterative process that teams use to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype and test" (Interaction Design Foundation, nd). The method is widely used by entrepreneurs wanting to solve ill-defined/unknown problems, as they can reframe these problems in human-centric ways and focus on what is the most important for users. Design thinking is probably the best design process when it comes to thinking "outside the box" (Interaction Design Foundation, nd). There are different approaches to conducting design thinking. The most essential aspects will now be presented.

In the Harvard Business Review article from 2008, Tim Brown gives an overview of what design thinking is. He refers to design thinking as "a methodology that imbues the full spectrum of innovation activities with a human-centered design ethos". Brown (2008) continues: "By this I mean that innovation is powered by a thorough understanding, through direct observation, of what people want and need in their lives and what they like or dislike about the way particular products are made, packaged, marketed, sold, and supported". According to Brown (2008), there is a myth that great ideas pop up in the minds of brilliant people. However, design thinking proves that a human-centered discovery process and its following iterative cycles of prototyping, testing, and refinement are not always done by experts. Figure 3.1. simplifies Tim Brown's model of design.

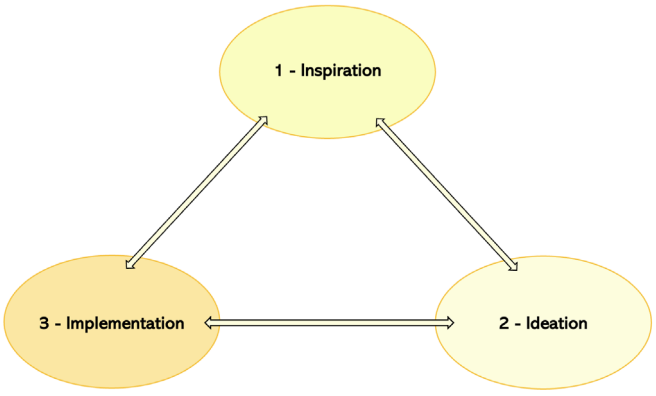

Figure 3.1: Simplified model of Tim Brown's Design Thinking model

The first phase is the inspiration phase. This is where the designer is inspired to innovate because of a problem or an opportunity, or both. The second phase is the ideation phase. In this phase, the idea is generated, developed, and tested. The third phase is the implementation phase. This is where the idea is charted for a path to market. Projects will loop back through these phases, especially the first two, to be refined (Brown, 2008).

Another way to look at design thinking is presented in Razzouk and Shute's (2012) literature review of design thinking. They look at the nature of design thinking and state that people tend to work in two different ways: either as finders or as makers: "Finders demonstrate their creativity through discovery. They are driven to understand and to find explanations for phenomena not well understood. Makers are equally creative, but they are driven to synthesize what they know in new constructions, arrangements, patterns, compositions, and concepts" (Razzouk and Shute, 2012). Another factor that reveals differences among professional fields is "the *content* with which a field works" (Razzouk and Shute, 2012). These two axes can be drawn as a conceptual framework.

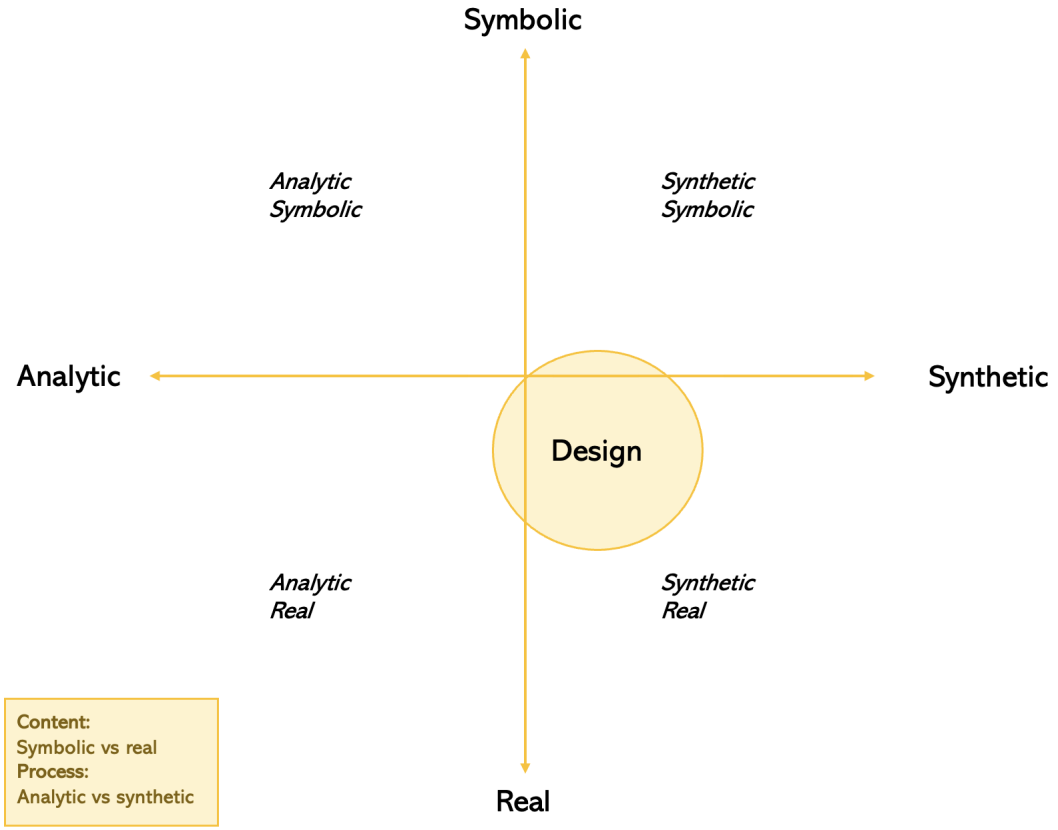

Figure 3.2: Conceptual representation of content and process factors. Based on Razzouk and Shute (2012)

Fields on the left side of the axis are more concerned with finding or discovering, while

fields on the right side of the axis are concerned with making and inventing (Razzouk and Shute, 2012). Furthermore, "fields in the upper half of the map are more concerned with the abstract, symbolic world, ... [while] fields in the lower half are concerned with the real world and the artifacts and systems necessary for managing the physical environment" (Razzouk and Shute, 2012).

in the upper half of the diagram are more concerned with the abstract, symbolic world. In contrast, fields in the lower half of the diagram are more concerned with the real world and the artifacts and systems necessary for managing the physical environment" (Razzouk and Shute, 2012). Design is placed in the synthetic/real quadrant, as it is "highly synthetic and strongly concerned with real-world subject matter" (Razzouk and Shute, 2012).

The Hasso Plattner Institute of Design (short: d.school) at Stanford has developed a five-stage design thinking framework. This model is based on that framework (Stanford University, 2010).

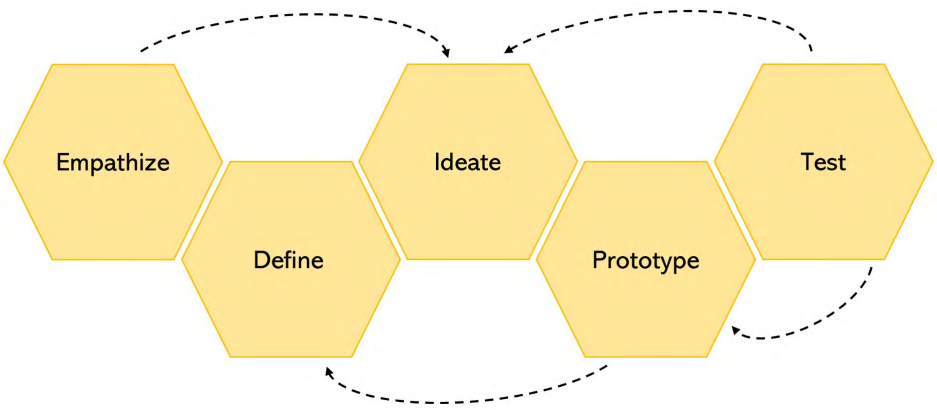

Figure 3.3: The Five Stages of Design Thinking. Based on Stanford (2010)

Phase 1 – Empathize

Empathize is the process of understanding people in the context of their design challenge. It is about figuring out how and why people do what they do, their needs, how they view the world, and what is meaningful to them. This phase entails observing users and what they do. To do this, one must engage, watch and listen (Stanford University, 2010).

Phase 2 - Define

This phase is about bringing clarity and focus to the design space. Based on what the design thinker has learned about the users through the empathize phase, he must define

the challenge he is taking on as clearly as possible (Stanford University, 2010).

Phase 3 - Ideate

After defining the challenges in the previous phase, it is time to focus on idea generation. The design thinker should “go wide” in order to view the challenge from a range of different perspectives. After one has looked at different options, it is time to narrow the focus to fewer ideas, the ones that seem best (Stanford University, 2010).

Phase 4 - Prototype

This phase is where one starts building prototypes based on the ideas generated in the previous phase. One must physically start building. It is important not to spend too much time on each prototype but rather try out different ones (Stanford University, 2010).

Phase 5 - Test

The last phase, testing, is where one tests prototypes that have come to life through phases 1 – 4. Here, one gets feedback and empathy from users who test the prototypes. This phase is another chance to understand the users. It is essential to show and don’t "tell” in this phase and let the user test the prototype properly. The users should try the prototype, not get an explanation (Stanford University, 2010).

It is important to note that these five stages are not "always sequential, and teams often run them in parallel, out of order and repeat them in an iterative fashion” (Interaction Design Foundation, nd).

Lastly, a model developed by the British Design Council in 2004 will be presented to complement the design thinking framework presented previously. The British design council describes its framework as follows: “[The] Double Diamond clearly conveys a design process to designers and non-designers alike. The two diamonds represent a process of exploring an issue more widely or deeply (divergent thinking) and then taking focused action (convergent thinking)” (British Design Council, 2022). The process is illustrated in figure 3.4.

The first diamond is about thoroughly understanding the users´ actual problems rather than just making assumptions. Phase 1 in diamond 1 is “discover”. This phase is where the innovators talk to people and gather relevant data. This phase can be compared to the empathize phase in the framework from Stanford. Phase 2 in diamond 1 is “define”. Here

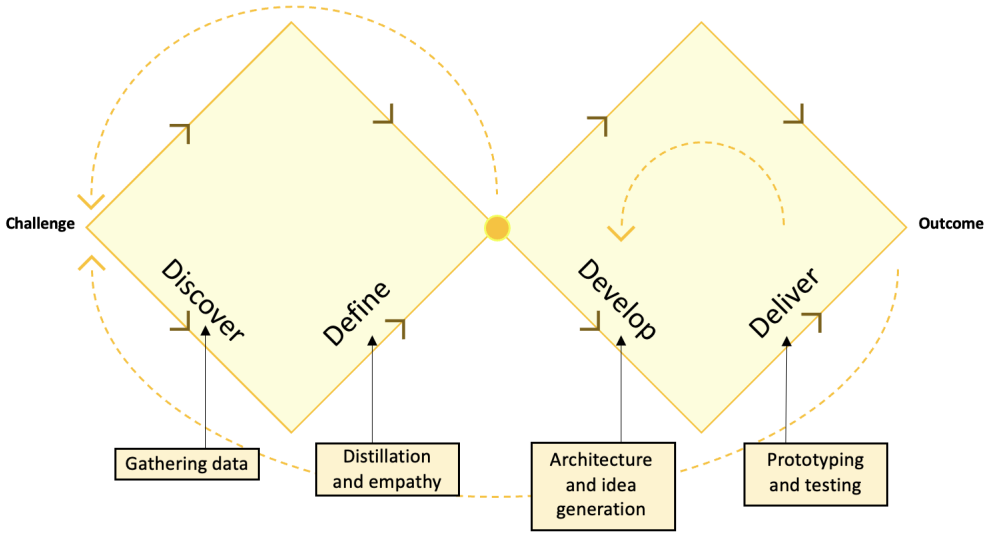

Figure 3.4: The Double Diamond of Design Thinking. Based on The British Design Council (2004) and Conway et al. (2017)

the innovators define the problem accurately. This phase is relatable to the define phase in the Stanford framework. The second diamond is about talking to people to receive different solutions to the problem defined in the first diamond. Phase 1 in diamond 2 is "develop". This phase is about seeking inspiration from people regarding the defined problem and collaborating with different actors to get a broad view. This phase is relatable to the ideation phase in the Stanford framework. Phase 2 in diamond 2 is "deliver". In this phase, the innovators test ideas on a small scale. The solutions that work will be improved, while those that do not work will be discarded. This phase relates to the prototype and test phases in the Stanford framework. Just like in the Stanford framework, it is necessary to note that this is not a linear process but one that goes back and forth (Interaction Design Foundation, nd).

3.1.1 Criticism of Design Thinking

Design thinking has been subject to different types of criticism. One such critique is that it is nothing more than commonsense repackaged and marketed for a big consulting fee. Another critique is that it is poorly defined. Also, some say it relies more on anecdotes than data. However, the main problem with design thinking is that it is a «strategy to preserve and defend the status quo» (Harvard Business Review, 2018). Design thinking is very similar to a method developed in the 1970s called the rational-experimental approach.

Both of these tools favor the powerful, as the designer ultimately decides which ideas and preferences are included in the solution. Further on, when privileging the designer's role, the innovation potential is radically narrowed down. Innovation stems from an array of meanings bumping into each other. However, when there is only one designer following the design thinking process, the potential for connections is reduced both in terms of what the designer sees as significant and the relationships the designer can imagine (Harvard Business Review, 2018). Also, when basing the design thinking process on perhaps only one person, the solution can be perfect for that one person, but it does not necessarily generalize to the wider public.

Design thinking is also criticized for being unsuited for uncertainty (Harvard Business Review, 2018). This is because once a design is complete, the space for change in that design is shut down. Climate change is one example of such an area. The climate and natural environment are changing at a rapid pace, with new scientific discoveries «revealing that we have far underestimated the complexity of the systems that are at play» (Harvard Business Review, 2018). Design thinking offers a rigid and formulaic solution, not capable of comprehending this.

3.2 Systems Thinking

Oxford defines a system as "an organized set of ideas or theories or a particular way of doing something" (Oxford University Press, 2022b). Another commonly understood meaning of a system is that it is a ""complex whole of related parts" - whether it is biological (e.g. an ecosystem), structural (e.g. a railway system), organized ideas (e.g. the democratic system), or any other assemblage of components comprising a whole. As such, when one sees a system, one usually sees the whole first, and then its elemental parts" (Cabrera et al., 2007).

There is a rapid growth of complex systems that continuously spring to life in the world around us. The world is getting more interconnected as globalization continues, which grows our social systems in new complex ways. "With the use [of] a skill set called systems thinking, one can hope to better understand the deep roots of these complex behaviors in order to better predict them and, ultimately, adjust their outcomes" (Arnold and Wade, 2015). The term systems thinking was first coined in 1987 by Barry Richmond. After

this, there have been many redefinitions of the term. In other words, there has been a difficulty among scholars to make a clear definition of systems thinking (Arnold and Wade, 2015). Arnold and Wade (2015) conducted an analysis of the systems thinking literature to try and make a clear definition. This analysis will be looked at to explain what systems thinking is.

According to Arnold and Wade (2015), "systems thinking can be viewed as a system. Systems thinking is, literally, a system of thinking about systems". They continue: "As with most systems, systems thinking consists of three kinds of things: elements (in this case, characteristics), interconnections (the way these characteristics relate to and/or feed back into each other), and a function or purpose". Based on this, a requirement for a complete definition of systems thinking is that the definition must contain elements, interconnections, and a purpose. To make a definition based on this, Arnold and Wade (2015) developed "The System Test". Figure 3.5 illustrates their test.

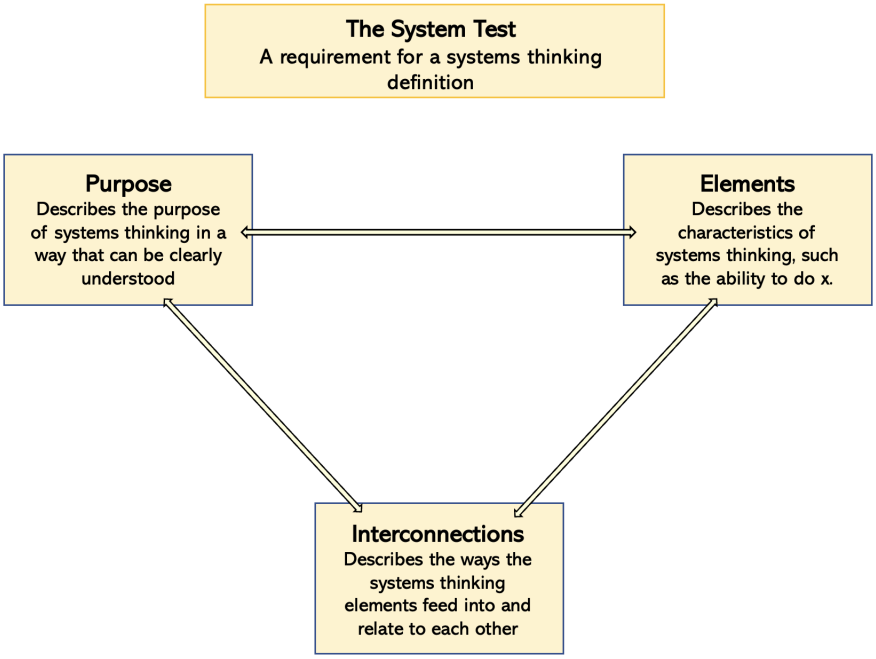

Figure 3.5: The System Test. Based on Arnold and Wade (2015)

Previous literature and definitions of systems thinking went through the system test. The purpose "should describe the purpose of systems thinking in a way that can be clearly understood and relates to everyday life" (Arnold and Wade, 2015). The elements will manifest as characteristics of systems thinking. Lastly, the interconnections are "the way the elements or characteristics feed into and relate to each other" (Arnold and Wade,

2015).

After going through seven different definitions, it became clear that none of them fully passed the systems test. However, the definitions are still useful and relevant, as much can be learned by extracting the most important aspects of each definition. Similar for all the definitions, they all tend to include interconnections, an understanding of dynamic behavior, seeing systems structure as a cause of that behavior, and seeing systems as a whole rather than parts. (Arnold and Wade, 2015). Based on the analysis of different definitions, Arnold and Wade (2015) propose a new way to define systems thinking: "to define systems thinking as a system by identifying its goal and then elaborating upon both its elements and the interconnections between these elements". As a result, the definition is the following: "Systems thinking is a set of synergistic analytic skills used to improve the capability of identifying and understanding systems, predicting their behaviors, and devising modifications to them in order to produce desired effects. These skills work together as a system". As this definition is defined by its objective or goal, a systemigram was made to also include elements and interconnections. Figure 3.6. simplifies the model of the systemigram.

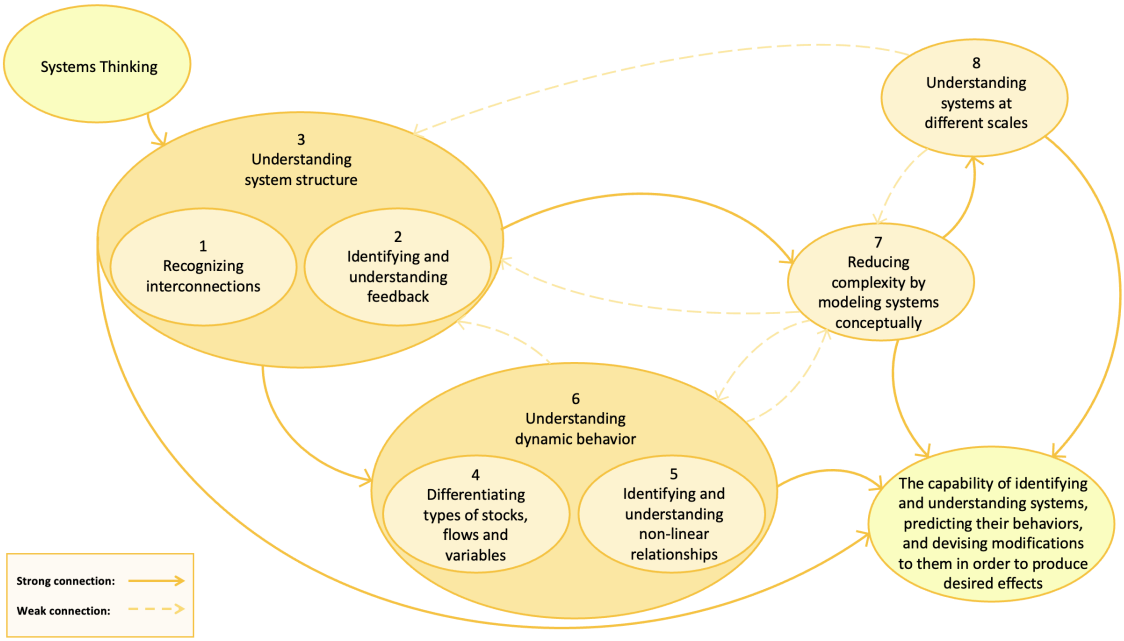

Figure 3.6: Systemigram of Systems Thinking. Based on Arnold and Wade (2015)

The nodes in the systemigram should be seen as a series of continuous loops and not as a linear process. Each of the elements in the systemigram improves itself and other elements continuously, which means that systems thinking itself is continuously improving (Arnold

and Wade, 2015). Based on Arnold and Wade's (2015), all the eight elements will now be described.

1. Recognizing interconnections: This base level of systems thinking involves the ability to identify key connections between parts in a system (Arnold and Wade, 2015).

2. Identifying and understanding feedback: This element states that some of the interconnections combine and hence form cause-effect feedback loops. These feedback loops need to be identified, and it needs to be understood how they impact system behavior (Arnold and Wade, 2015).

3. Understanding system structure: System structure consists of elements and the interconnections between them. This structure and how it facilitates system behavior need to be understood. To understand system structure, recognizing interconnections and understanding feedback are keys (Arnold and Wade, 2015).

4. Differentiating types of stocks, flows, variables: Stocks are any pool of a resource in a system. It can be physical, like the amount of water in a bottle, or emotional, like the level of commitment in a relationship from one human to another. Flows are the changes in these levels. Variables are the changeable parts in a system that affects stocks and flows. This can be the flow rate or the maximum quantity of a stock. It is a critical systems thinking skill to differentiate stocks, flows, and variables (Arnold and Wade, 2015).

5. Identifying and understanding non-linear relationships: This refers to stocks and flows of a non-linear nature. This could also be placed in the earlier category, but to avoid confusion between linear and non-linear flows are separated into two different elements (Arnold and Wade, 2015).

6. Understanding dynamic behavior: This sums up the two previous elements. To differentiate between stocks, flows, and variables, identifying and understanding non-linear relationships are keys to understanding dynamic behavior (Arnold and Wade, 2015).

7. Reducing complexity by modeling systems conceptually: Conceptually modeling different parts of a system and viewing the system from multiple perspectives fall under this element. Through the use of multiple methods, such as reduction,

transformation, abstraction, and homogenization, this activity extends beyond the scope of the defined system model and into the realm of intuitive simplification (Arnold and Wade, 2015).

8. Understanding systems at different scales: This last element involves the ability to recognize different scales of systems and systems of systems (Arnold and Wade, 2015).

3.2.1 Systems mapping

A way to analyze the system one takes part of is to conduct a systems mapping analysis. Systems mapping is the tool used by the partners in 20tretti to analyze their impact on their surroundings. "Systems thinking requires a shift in our perception of the world around us. In order to build a new multidimensional thinking framework, we need to discover the dynamics and interconnectedness of the systems at play. This is where systems mapping tools come in" (Acaroglu, 2017). She continues: "[systems mapping tools] provide an exploration of the system, communicate understanding, and allow for the identification of knowledge gaps, intervention points, and insights".

Joelle Cook (2015) describes three areas where system maps are useful. The first one is to help capture the system that is evaluated, "along with its various sub-systems" (Cook, 2015). Secondly, systems maps are helpful in telling the story of the level of complexity of the initiative in a non-linear way. Lastly, systems maps help identify where to focus the evaluation (Cook, 2015)

There are different ways to approach mapping the system to represent system elements and connections. Cook (2015) emphasizes the following methods:

- Actor map: shows which individuals and organizations are key players in the space and how they are connected.
- Mind map: highlights various trends in the external environment that influence the issue at hand.
- Issue map: lays out the political, social, or economic issues affecting a given geography or constituency.

- Causal-loop diagram: focuses on explicating the feedback loops that lead to system behavior or functioning.

3.2.2 Criticism of Systems Thinking

One of the main downsides of systems thinking is complexity. First of all, when drawing a systems map, it is not easy to know where to stop. If one is to include all actors that are relevant and plays only a minor part, it is hard to finish the job. Not only would it take a very long time, but it would also be virtually impossible to know about all actors that play a part in the system around oneself. Secondly, it is also challenging to know about all one's externalities. For example, if one is a producer of furniture and buys textiles from a developing country, it isn't easy to know whether the workers there have good working conditions or not. Knowledge like this is one thing. Another thing is where one's responsibility stops. Does it stop with ones supplier of textile, or the supplier to the supplier, or even further down in the value chain? Regarding environmental concerns, it is difficult to measure how much CO2 emissions one is responsible for emitting. First of all, how do we measure it? Secondly, where does one's responsibility stop? (The Greenhouse Gas Protocol, 2004). In other words, systems thinking and mapping are extremely complex exercises that will be both time-consuming and practically impossible to conduct with 100 percent precision.

3.3 Sustainability-Oriented Innovation

In a study from 2016, Adams et al. assess existing literature about sustainability-oriented innovation (SOI). They reveal that little attention has been paid to SOI. Therefore, they "develop a synthesized conceptual framework onto which SOI practices and processes can be mapped" (Adams et al., 2016). First, Adams et al. (2016) make an initial model of SOI before making a final model of SOI. Both will be analyzed.

Developing an initial architecture for reviewing SOI and initial model of SOI
A key question regarding sustainability is: "what are the innovation activities firms engage in to become sustainable?" (Adams et al., 2016). This question implies that organizational change happens over time. It is a dynamic process. The same goes for sustainability: it is not either/or; it is about becoming. In Adams et al.'s (2016) review of previous literature,

they find that there has been a narrow, product-centric view on SOI. The focus has been product innovation or NPD, product and process innovation, and product, process, and organizational innovation. Drawing on these studies, three dimensions emerge, as presented in figure 3.7.

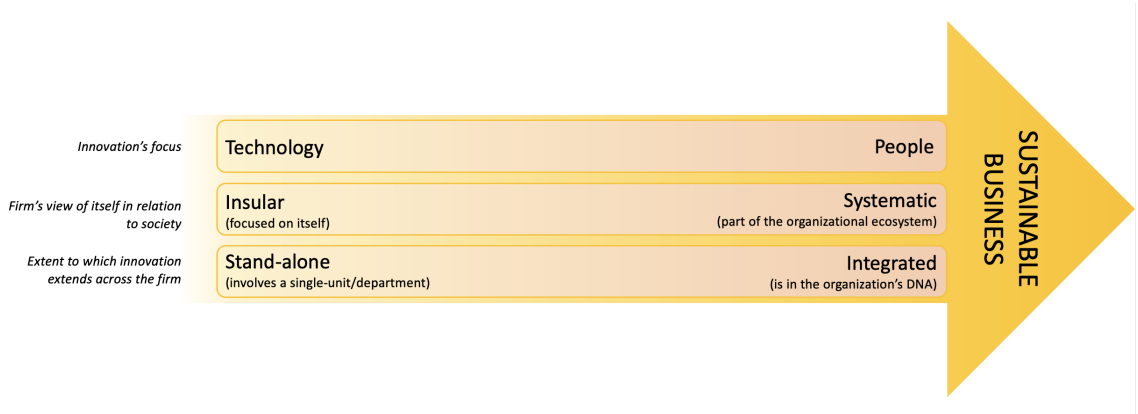

Figure 3.7: SOI dimensions. Based on Adams et al. (2016)

- Technical/people: the existing literature has been product-oriented and focused on technical aspects. This has led to incremental adjustments in practice concerning environmental aspects. On the other side is people-oriented innovation, where sustainability is "treated as affecting a cluster of elements including, for example, technology, regulation, user practices and markets, cultural meaning, infrastructure and supply networks" (Adams et al., 2016).
- Stand-alone/integrated: this dimension is internal in the firm and comprehends to what extent SOI extends across the firm. The stand-alone side of the scale means that only a tiny part of the business includes SOI in their thinking, while the other side, integrated, means that SOI is widely integrated across the firm.
- Insular/systemic: this dimension reflects how the firm views itself in relation to broader society. On the insular end of the scale are the companies that only focus on themselves regarding how they can innovate. The firms belonging to the systemic end of the scale are designed to impact the more comprehensive socio-economic system beyond the firms' boundaries and stakeholders. "More progressive SOI firms are described as looking beyond their boundaries, engaging with and facilitating change in wider systems and engaging with diverse actors" (Adams et al., 2016).

Adams et al. (2016) state that sustainability has recently been seen as a systemic problem

where the challenges are too big for a single organization to handle alone. Because of this, SOI must address and work on different external issues, collaborators, and stakeholders. Based on this, Adams et al. (2016) propose three initial contexts of SOI activity. These three contexts are reactive, embedding, and systems change, as shown in figure 3.8.

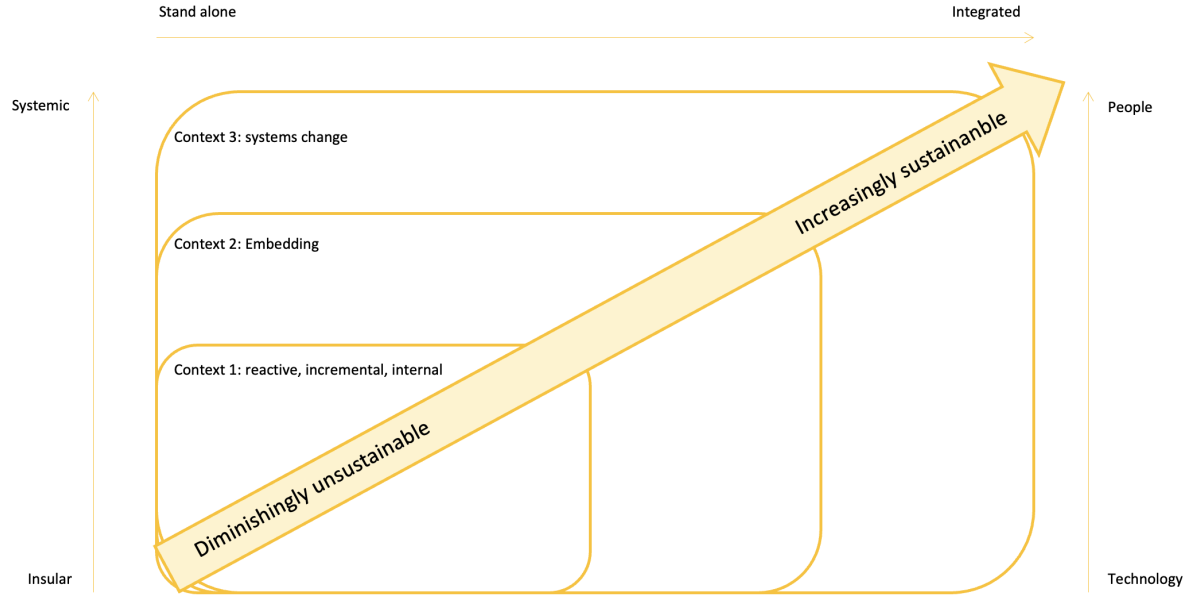

Figure 3.8: Initial Model of SOI. Adapted by Adams et al. (2016)

This model is based on the first model of SOI made by Adams et al (2016). A company becomes more sustainable when going from insular to systemic, from stand-alone to integrated, and from technology-focused to people-focused. After reviewing more literature, Adams et al. (2016) made changes to the model. This brings us to the final model of SOI.

Final model of SOI

After tweaking the model by gathering and analyzing more relevant data, Adams et al. (2016) made a final model of SOI. The three-stage model illustrated in figure 3.9. is based on their framework.

1 – Innovation activities of operational optimization:

This stage entails that the business is internally oriented in its view of sustainability. The business' thinking is: "doing the same things but better". It is a reactive approach that focuses on reducing harm through incremental improvements, often driven by compliance. These activities are typically technical, stand-alone, and insular.

2 – Organizational transformation:

This stage is a step further than just compliance. The companies here don't just think

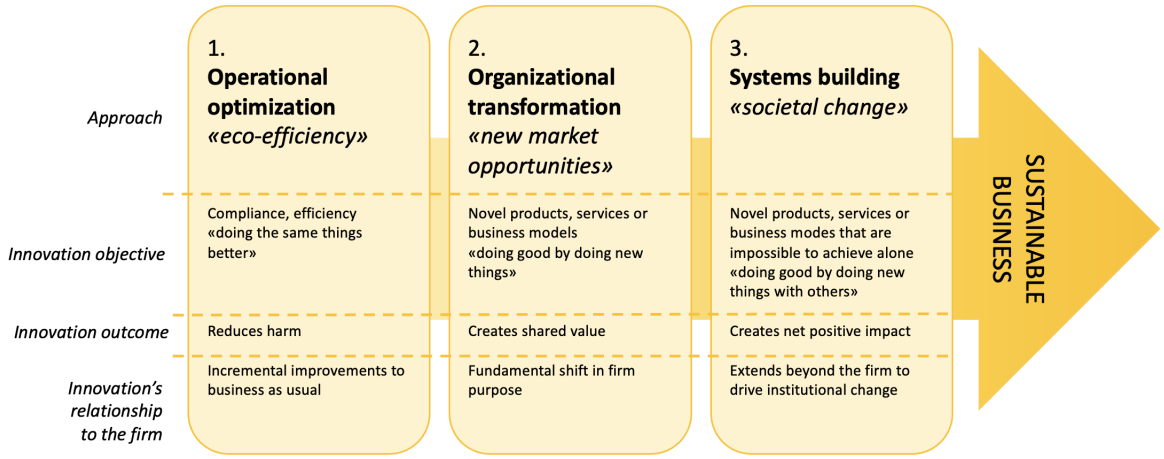

Figure 3.9: Final Model of SOI. Adapted by Adams et al. (2016)

about how they can reduce harm; they go further and focus on how they can create shared value and deliver wider benefits to society. They do this by thinking about how they can "do good by doing new things". "The context is characterized by a redefinition of internal and external relationships that increasingly are conceived in terms of environmental and social impacts" (Adams et al., 2016). Activities in this stage are typically more people-oriented, integrate sustainability more deeply within the organization, and are less insular.

3 – Building systems:
The final stage of SOI requires a radical shift in philosophy to thinking beyond the business and reframing the purpose of business in society. "Doing good by doing new things with others" (Adams et al., 2016). Sustainability can't be viewed as an attribute of one single firm. It has to be applied at a global level. Linkages between actors and collaboration towards a sustainable future are critical here.

The three stages of SOI are summarized in figure 3.10.

To sum up, what SOI is, Adams et al. (2016) made this definition: "Sustainability-oriented innovation (SOI) involves making intentional changes to an organization's philosophy and values, as well as to its products, processes or practices, to serve the specific purpose of creating and realizing social and environmental value in addition to economic returns".

	Operational optimization: doing more with less	Organizational transformation: doing good by doing new things	System building: doing good by doing new things with others
Strategy	Comply with regulations or pursue efficiency gains	Embed sustainability as a cultural and strategic norm in a shaping logic that goes beyond greening	Logic of wide collaborations and inveting in systems solutions to derive new, co-created value propositions
Process	Focus on internal and incremental innovation faciliated by use of tools	Adopt new values and platforms	Adpot new collaborative process platforms with diverse stakeholders
Learning	Exploit existing knowledge management capabilities to identify and access relevant knowledge	Engage with key stakeholders of the firm – internal and external	Develop ambidextrous skills enabling «shadow tracking» and learning from experimentation with multiple new approaches
Linkages	Recruit external domain experts for new knowledge	Shift focus from intra-firm linkages to collaborations with immediate stakeholder	Get the whole systemin the room to diagnose problems, understand system complexity, build trust and identify levers for change
Innovative organization	Exploit existing innovation capabilities	Embed SOI culture through the organization	Adopt new business paradigms

Figure 3.10: Summary of the three stages of SOI. Based on Adams et al. (2016)

3.4 Combining Design Thinking and Systems Thinking

As stated in chapter 2.4, Wilkerson and Trellevik (2021) look at how SOI can be achieved by combining elements of design thinking and systems thinking.

The main idea behind design thinking is, as explained earlier, to work in a loop that aims to continuously develop and improve a product or service rather than completing it. In contrast to traditional innovation methodologies, where companies innovated behind locked doors before launching their product, design thinking opens companies' doors and invites users to participate in the innovation process. The core focus of the process is the user needs, and the number of iterations in the process is largely based on users' feedback.

In order to develop products that precisely meet customer needs, design thinking is very effective and should be saluted for putting human needs at the center of innovation. However, it lacks the ability to consider environmental and societal aspects. For that reason, the model is subject to several challenges concerning sustainability. Firstly, even though user needs exist in society, it does not necessarily mean that these needs should be capitalized, seen from a sustainability perspective. Although design thinking is an effective innovation methodology, it can be discussed if it is too narrow and, thus, unable to create sustainable solutions. Secondly, it is challenging to determine the ownership of

the user's needs. For example, it is difficult to determine who has ownership of climate change. Design thinking is based on bringing the user's voice to the decision table, but the voice of climate change is arguably ignored (Wilkerson and Trellevik, 2021).

Simply put, one could say that systems thinking solves the mentioned challenges of design thinking, by having a broad view of companies' and consumers' externalities instead of focusing on a singular user need. There is a greater potential for incorporating sustainability when user needs are considered in a larger system. By studying the connections and dynamics between relevant players within an industry, it becomes easier to capture sustainability elements, such as carbon emissions and plastic waste (Wilkerson and Trellevik, 2021).

On the other side, systems thinking models are complex and time consuming. Complexity in innovation methodologies could harm the effectiveness of the product or service that should be developed. The question that remains is therefore: how could we take the best from design thinking and the best from systems thinking? Or more precisely, how could we combine the flexibility and user-friendliness from design thinking with the broad perspective from systems thinking?

By employing systems mapping in the problem definition phase of design thinking, limitations with design thinking are to a greater extent addressed (Wilkerson and Trellevik, 2021). A model based on Wilkersen and Trellevik (2021) modifies the double diamond model presented in figure 3.11, with a broadened problem definition phase.

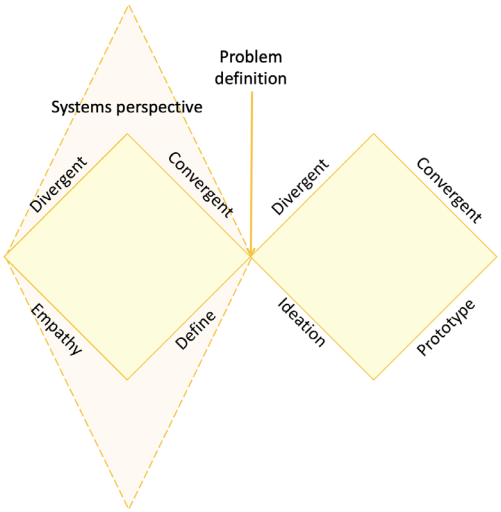

Figure 3.11: Design Thinking With a Broadened Problem Definition Phase. Based on Wilkerson and Trellevik (2021)

4 Research method

Building a solid methodology framework is essential in research, and we will in this chapter explain the choices we have made to examine our hypothesis as optimal as possible. More explicitly, we will go through the research approach, design, strategy, and data collection. At last, we will discuss the reliability and validity of our data, and the ethical aspects related to our research.

4.1 Research approach

Our research uses an inductive approach. The research is generalizing from the specific to the general, as we are looking at one specific case. The data collection is used to explore a phenomenon, as we are interviewing the participants of 20tretti to find out how they found the program. The thesis will contribute to generating and building theory based on the data analysis, as there is little existing research in this field. Suppose the respondents are satisfied with the 20tretti program and the program seems to deliver more successful sustainable innovations to the market. In that case, the innovation methodology in the program and/or its practical application seem to be effective.

Further, our thesis is a combined study building on both exploratory and evaluative research. It is exploratory because we want to find out what is happening in the 20tretti program and how the participants of 20tretti found the program. There is not much scientific research on how this specific innovation methodology affects the number of sustainable innovations delivered to the market. The thesis is also evaluative as it seeks to find out how well the innovation methodology that 20tretti builds on works. A typical characteristic of evaluative research is the goal of assessing how effective something is, for example, a business strategy, a program, or initiative (Saunders et al., 2019). In our case, we are evaluating the 20tretti program, which builds on the innovation methodology.

4.2 Optimal research design

There are many methods to be chosen when answering our research question. The most optimal research models often require adequate resources, time, and suitable timing.

Although we are aware that our master's thesis project has limited time and resources, we have built our research model by aiming at the most optimal research design. Due to several factors beyond our control, we have taken the optimal design and adjusted it to fit a more realistic model.

As our project subtitle expresses, we have chosen a qualitative case study. However, in this chapter, we find it relevant to describe the optimal design that we would have chosen under ideal circumstances.

4.2.1 Experiment

As described by the hypothesis in section 1.2, we aim to study if there is a greater probability for startups participating in the 20tretti program to deliver sustainable solutions to the market than for startups not participating in the program. A suitable research strategy that could be applied to answer this is an experiment. Experiments have primarily been developed and applied in natural science but are also convenient for psychological and social science research. The main idea of an experiment is to study the probability of a change in an independent variable causing a change in another dependent variable (Saunders et al., 2019). Thus, experiments are of great fit when studying cause-effect relationships, where the independent variable is the cause and the dependent variable the effect. The dependency of the variables can be explained as the value of the independent variable being independent of other variables in the study, while the value of the dependent variable depends on changes in the independent variable.

For our research, the independent variable would be the extent of participation for startups in the 20tretti program, which is simply a binary categorical variable with two possible values: participation or no participation. Furthermore, since we are studying how the participation of startups affects the probability of delivering sustainable innovations to the market, our dependent variable would be the amount of new sustainable innovations.

> ***Independent variable:*** Participation or no participation for startups in 20tretti.
>
> ***Dependent variable:*** Amount of sustainable innovations startups are delivering to the market.

Moreover, experiments study whether there is a relationship between the independent

and dependent variables by using hypothetical explanations (Saunders et al., 2019). In a standard experiment, two hypotheses are formulated: the null hypothesis and the alternative hypothesis. A null hypothesis proposes that no statistical significance exists in a set of given observations, thus stating no relationship between the variables. On the other hand, the alternative hypothesis states that there is a relationship. For our research, the hypotheses would be as follows:

H0: Participation of startups in the 20tretti program will not lead to more sustainable innovations in the market.

H1: Participation of startups in the 20tretti program leads to more sustainable innovations in the market.

4.2.2 Experimental designs

Several experimental designs exist, each with different characteristics, advantages, and disadvantages. In a classical experiment, the participants are randomly assigned to either an experimental group or a control group. The experimental group will be subject to some form of intervention or manipulation of the independent variable, while no such intervention will be made in the control group. Before the intervention, the value of the dependent variable is measured for both groups in a pre-test. Then, after the intervention is made in the experimental group, the value of the dependent variable is once more measured in a post-test. This enables the researcher to compare the pre-test and post-test and analyze which effects the independent variable has on the dependent variable.

The ideal experiment design for our research would be a quasi-experiment. Quasi-experiments are similar to classical experiments but do not randomly assign participants to experimental or control groups (Saunders et al., 2019). In our research, the experimental group would consist of startups participating in the 20tretti program, while the control group would consist of startups not participating in the program. Our sample of data is pre-formed groups that we cannot assign randomly.

The quasi-experiment would start with measuring the dependent variable, namely the number of sustainable innovations that the startups are delivering to the market. This pre-test would be conducted before the 20tretti program, such that the participants in the two groups would be measured on equal basis. Then, the experimental group would

be exposed to the intervention, or in other words, be enrolled in the 20tretti program. Sometime after the 20tretti program, the comparison between the two groups would be made by once more measuring the number of sustainable innovations that the startups are delivering to the market.

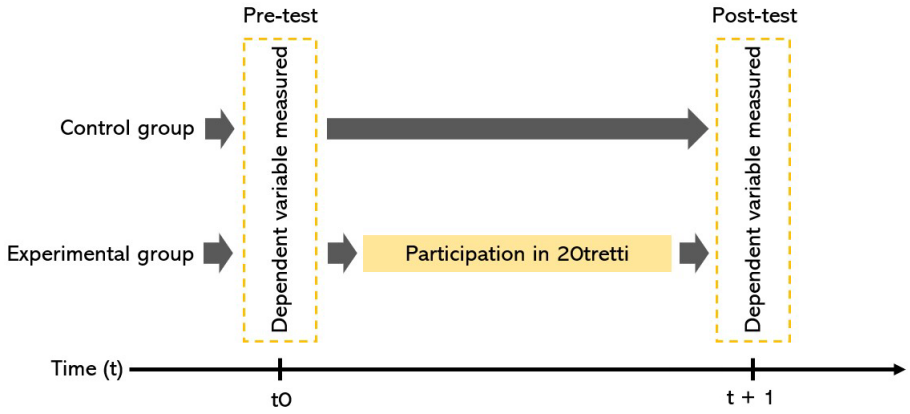

Figure 4.1: Quasi-experiment as the optimal research design

4.2.3 Challenges with an experimental design

The quasi-experimental design may be a thorough and systematic way to study our hypothesis, but it also includes several challenges. Firstly, regarding the dependent variable, it requires a lot of time to measure the number of innovations that startups are bringing to the market. Innovations develop over time and are subject to unpredictable factors, such as timing, market trends, and economic downturns. Therefore, one needs to set a spacious time frame to accurately measure the number of innovations delivered to the market. Secondly, it is challenging to choose indicators that tell whether there is an innovation in the market or not. One could look at how much turnover a product or service generates, profit margins or growth, and survival rates of the startups, but it will still be challenging to measure it quantitatively.

Because we became engaged in this master's thesis project while the 20tretti program was already running, it was simply impossible for us to perform the pre-test. In addition, the post-test would also require a significant amount of time that would not fit into the time schedule of a five-month master's thesis project.

Furthermore, another challenge is the desirable size and characteristics of the sample data. In order to make a fair comparison of the control and experimental group, the samples

must be similar. This means that the startups in the two groups need to have similar characteristics, such as the number of employees, age, industry, and more. In reality, our available sample data are limited to the startups that were selected by partners in the 20tretti program 2021. These were 14 different startups with different characteristics. For instance, some had been operating for several years while others were just founded. Also, to measure their performance on innovations quantitatively and achieve statistical significance, the sample size of the experimental group should be greater than 14. Thus, selecting samples has been naturally limited to the available participants of last year's 20tretti program, and we therefore needed to adjust the research design to a more realistic model.

4.3 Chosen research design

After outlining the most optimal research design, we have adjusted our model to make it fit the scope of our thesis. As explained in the previous section, several factors limit the realization of the optimal research design, such as shortage of time and unavailability of two similar sample groups. For that reason, we have chosen a qualitative research design that enables us to study our research topic within the given boundaries.

As introduced in section 1.1, we have formulated three sub-questions which form the basis of our research design to clearly answer the research question qualitatively:

1. Has there been delivered, or is it expected to be delivered, more sustainable innovations to the market as a result of the 20tretti program?
2. To what extent is the theory behind the innovation methodology responsible for more/less innovations?
3. To what extent is the practical application of the innovation methodology responsible for more/less innovations?

4.3.1 Case study

Various qualitative research strategies aim to use non-numeric data, such as words, audio recordings, and images to obtain in-depth knowledge and understanding of specific contexts or situations. Qualitative research essentially includes strategies such as grounded theory,

action research, ethnography, narrative inquiry, and case study (Saunders et al., 2019), where the latter is the strategy we have found most convenient to apply.

In case studies, one investigates phenomena or topics within their real-life settings (Yin, 2018). Such phenomena or topics could be a person, an organization, or an event and is what the term 'case' refers to. The case we are studying in our research is the 20tretti program. More precisely, we are examining what effects the program and the innovation methodology it applies have on sustainability-oriented innovations.

Some quantitative strategies, such as experiments and surveys, often struggle to capture the relationship between the phenomenon and the context within which it is being studied due to a set of preset variables. On the other hand, qualitative case studies are often used in such situations and perform well for studying the distinction between the phenomenon and its context (Yin, 2018). In our project, the phenomenon is considered to be the number of sustainable innovations delivered to the market, while the 20tretti program is the context this is being studied within. Still, we have no apparent knowledge about the boundaries and relationships between the potential sustainable innovations and the 20tretti program. Hence, a case study is an ideal fit for our research topic.

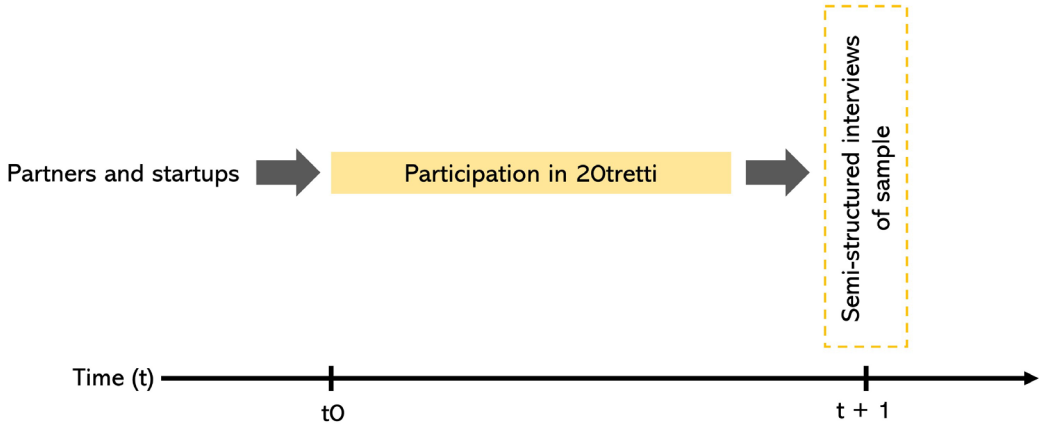

Figure 4.2: Qualitative case study as our chosen research design.

The case study differs from an experimental design. Firstly, there is less need for the independent and dependent variables. Thus, these are excluded from our research design. Secondly, there is no particular need for neither a null hypothesis nor an alternative hypothesis, as quantitative statistical tools are usually not applied in qualitative case studies. However, the research hypothesis described in section 4.2.1 is still a fundamental part of our research.

4.4 Data

4.4.1 Selection of samples

In some research models, it is possible to collect data from all individuals within a population if it is a manageable size. When this is the case, it is called a census (Saunders et al., 2019). However, collecting data from all the individuals in a population does not necessarily mean that the result becomes better compared to collecting data from a sample. In general, sampling is a convenient alternative to census when:

- it would be impracticable to collect data from the entire population
- there are budget constraints to the research
- there are time constraints to the research

In all these cases, you need to select a sample from which you will gather data. Sampling techniques enable researchers to reduce the amount of data necessary for collection by only considering data from a subgroup rather than all possible cases or elements (Saunders et al., 2019).

In our research, the population consists of startups and partners that participated in 20tretti. As there were 18 partners and 14 startups enrolled in the program after the *Collab* phase, the total population size was 32. When choosing our sample, we used non-random sampling, which often includes some extent of subjective judgment. Furthermore, we found purposive sampling to be the most relevant for our thesis when choosing the most appropriate sampling technique. In such a sampling technique, you have to use your judgment to select the correct number of respondents, which explains why the technique is also known as "judgment sampling" (Saunders et al., 2019).

When using purposive sampling, one has to be careful when selecting the respondents, as this technique can not be considered statistically representative of the whole population. We decided to use heterogeneous sampling and tried to prevent bias regarding unambiguously opinions among startups and partners. To obtain a sample with diverse perspectives, StartupLab provided us with insights and impressions they had made of the program's participants. In other words, to avoid a predominance of respondents either exclusively positive or negative about the program, we contacted startups and partners that

Respondent no.	Type of firm	Employees	Name	Coll. with
Respondent 1	Startup	10	Startup 1	Partner 1
Respondent 2	Startup	1	Startup 2	
Respondent 3	Startup	10	Startup 3	
Respondent 4*	Startup	25	Startup 4	Partner 4
Respondent 5	Partner	>30 000	Partner 1	Startup 1
Respondent 6	Partner	>20 000	Partner 2	
Respondent 7	Partner	>250	Partner 3	
Respondent 8	Partner	>700	Partner 4	Startup 4

**E-mail correspondence*

Table 4.1: Overview of respondents.

constituted diverse views on the program. This was based on StartupLab's impressions of how successful the partnerships were and the participants' general experiences. After choosing our sample based on these insights, most respondents confirmed our request. However, we did not receive replies from all of our initial, preferred respondents and had to reach out to our second draft. Despite that, we experienced that the respondents we interviewed had diverse views and opinions of 20tretti.

Our initial plan was to interview four partners and four startups and, if necessary, conduct more interviews with either some or all respondents. The research literature recommends conducting interviews until data saturation is reached, meaning until the data you collect provides little or no new information (Saunders et al., 2019). However, we were satisfied with the data collected after the interview and did not find it necessary to conduct more interviews.

A last-minute cancellation from one of the respondents slightly changed the initial plan. Although we tried to reschedule the interview, the respondent had a tight time schedule and did not find any available time to conduct the interview later. However, we collected some data from the respondent as the respondent answered key questions by e-mail.

Naturally, this becomes a weakness of our study, and we consider the number of respondents to be seven, not eight. Although we got valuable input from the respondent through e-mail correspondence, we could not ask follow-up questions, study reactions, or comprehensively investigate the respondent's thoughts about our research topic.

Table 4.1 presents an overview of the respondents. In chapter 5 and 6, the respondents will be addressed to their corresponding name in the *Name*-column. (Startup 1, Partner

2, etc.).

4.4.2 Semi-structured interviews

To answer our research question, we chose to conduct semi-structured interviews. As we use a single data collection technique, it falls into the category of mono method qualitative study. Semi-structured interviews enabled us to make a list of themes with some main questions before conducting the interviews. In relevant situations, we asked more detailed questions. As the startups and partners have different characteristics, we saw it as an advantage to have the outline of the interviews similar but necessary to differentiate a bit between the respondents. Therefore, semi-structured interviews were the most sufficient choice of data collection.

The interviews were conducted digitally on Microsoft Teams, also known as internet-mediated interviews (Saunders et al., 2019). This method was chosen for several reasons. Firstly, the respondents were located in different cities in Norway and considering thus, it was practically challenging to conduct all interviews physically within the time frame of our data collection period. Even though it is always pleasant to physically meet the person you interview to get the social interaction, we found online video interviews as almost equally good. Therefore, the practical benefits of online video interviews outweighed the slight advantage of physical interviews. Further, there would also be possible to conduct some interviews physically and some online. However, to avoid any potential bias in using different data collection methods, we chose to be consistent with the video-interview approach.

To ensure that the interviews were as good as possible, we considered the five P's; "Prior planning prevents poor performance". Saunders et al. (2019) outline three key measures that the preparations should include:

- Level of knowledge: this is our knowledge of the broader topic, meaning the innovation methodology and 20tretti, and about the partner or startup interviewed. Being able to draw on information found online about the companies is a good way to show credibility (Saunders et al., 2019). We made sure that our knowledge about the partners and startups was updated, and naturally, we had knowledge about the broader topic.

- Developing interview themes and supplying information to the interviewee before the interview: Another way to promote credibility is to provide relevant information to the participants before the interview. When we first contacted the participants, we provided them with insights into topics we wanted to discuss and hear about, which allowed them to prepare if they wanted to. This should strengthen the credibility and validity.

- Appropriateness of the intended interview location: as described earlier, we conducted the interviews online. The participants were all familiar with online video interviews after the pandemic. According to Saunders et al. (2019), we should choose a location concerning our own personal safety. Staying at home surely ticks that box. In addition, the place can have an impact on how the respondents respond. To make the best out of the online video interviews, we tried to have a clean background and clothes fitting the occasion to look more proficient.

Further on, how one chooses to open the interview is essential. When you have not met the respondent(s) before the interview, the first few minutes of the conversation will significantly impact the interview outcome. This is related to the interviewer's credibility and how confident the respondent feels (Saunders et al., 2019). At the start of the interview, we thanked the respondent for prioritizing time and briefly explained our project and their contribution to the thesis. We made sure to state that the respondent's answers were anonymous. In addition, we explained that the video recording of the meeting would be deleted right after it was transcribed and that the transcription would be deleted after the thesis was handed in and graded. Also worth noting is that we did not mention the other participants participating in the program to demonstrate confidentiality. Lastly, we stated the length of the interview.

A considerable amount of time was spent outlining the questions for the interviews. A good template should reduce the chances of bias and increase the reliability of the information obtained. We divided the template into three main categories, based on the three sub-questions outlined previously. Further, the questions should be stated clearly and in a neutral voice tone (Saunders et al., 2019). To make all the interviews as similar as possible, one of the researchers was in charge of the interviews and asked the questions. We chose to do it like that to decrease the chances of any different tone of voice or neutrality.

The other researcher asked some follow-up questions during the interviews or a question or two at the end if he saw some information gaps. As stated before, we had a few key questions with more sub-questions that we could ask if necessary. The key questions were often quite open. After that, we followed up with more questions where necessary. These could be more probing, meaning significantly essential questions to the research question. It could also be specific and closed questions, in order to get specific knowledge about something (Saunders et al., 2019).

4.5 Reliability and validity

Issues related to reliability and validity have already been partly outlined in the previous section. In this section, the terms will be described and analyzed in more detail.

4.5.1 Reliability

Reliability is the extent to which the data collection technique will yield consistent findings, and similar observations would be found or conclusions reached by other researchers. If a researcher can replicate an earlier research design and achieve the same findings, the research would be seen as being reliable (Saunders et al., 2019). There are four typical threats to reliability (based on (Saunders et al., 2019). These will be gone through, followed by other specific threats to reliability in our thesis.

- Participant error: this can be any factor that alters how a participant performs (Saunders et al., 2019). An example here can be that the interview is just before lunch, which makes the participant rush the answers to go to lunch. To address this issue, we stated the intended length of the interview the first time we contacted the participants. We also repeated this information at the start of each interview.
- Participant bias: this is any factor that induces a false response (Saunders et al., 2019). An example is interviewing in an open space, which leads to falsely positive answers from the participant. To address this issue, we made it clear that the answers to our questions would be confidential. Regarding the "open space" issue, the participants sat in their offices and could not be heard by anyone. In addition, we also tried to create a good and trustworthy atmosphere while interviewing to make the participant feel secure enough to give solid and honest answers.

- Researcher error: this can be any factor that alters the interpretation of the researcher (Saunders et al., 2019). In our case, it was an advantage that we were two people. If the main interviewer didn't go through all the questions adequately, the other could jump in and make sure that all the themes/questions were covered.
- Researcher bias: this can be any factor that induces a bias in the researcher's view of the responses (Saunders et al., 2019). The interviewer mustn't let his subjective view get in the way of accurate data gathering from the respondent.

As our thesis is based on our subjective interpretation of the respondents' answers, there is a concern regarding the replicability of our findings. This can relate to the size of the population interviewed and whether the result is a coincidence and would differ if we interviewed other participants of 20tretti. To address this issue, we asked StartupLab to provide us with their view of how the different participants found 20tretti and which partners and startups expressed that they saw the participation of 20tretti as successful. We tried to interview participants from both sides of the spectrum. In the end, we believe that the data collected gave us a solid idea of the general opinion of 20tretti. If not, we would have to conduct more interviews.

Another way to strengthen reliability is to make the respondents and their answers anonymous and emphasize this to the respondents. When the respondents know that what they say cannot be linked to them, it is easier to open up and not hold back on anything. We made sure to tell the respondents at first contact that they would remain anonymous and repeated this at the start of each interview. After the interviews, we didn't save the transcriptions with the person or company's name, but made codes to protect the respondents. The videotapes of the interviews were deleted as soon as the transcription was done, and the transcription will be deleted when the thesis is handed in and graded. This information was provided to the respondents before the interviews, which hopefully made them feel safer regarding anonymity. This should strengthen reliability.

4.5.2 Validity

Validity is the extent to which the data collection method accurately measures what it was intended to measure (Saunders et al., 2019). In our case, we had to go through our questions several times to see if the question indeed helped us answer what we actually

wanted to find out, namely if the participation in the program promoted more sustainable innovations to the market compared to no participation in the program. There are two types of validity: internal validity and external validity. Internal validity "refers to the extent your findings can be attributed to the intervention you are researching rather than flaws in your research design" (Saunders et al., 2019). External validity is how generalized your research findings are in other contexts (Saunders et al., 2019). Saunders et al. (2019) outline some typical threats to internal validity. We will look at the most relevant ones, followed by other specific validity threats in our thesis.

- Past or recent events: this is any event that changes the participants' perception. In our thesis, this could be if the partner discarded a partnership between a partner and a startup just before our interview with the startup. Such an event could cause the startup to be extra negative when talking about the partner but also the program in general. In such a case, we would have look out for potentially biased perceptions. However, to our knowledge, no such events took place before any of the interviews.
- Mortality: this is the impact of participants withdrawing from the study. In our case, one out of eight withdrew from the interview, but was able to answer some questions via e-mail. This one lacking interview did not threaten our internal validity, as we still managed to conduct seven interviews which provided us with enough insight.

As stated before, we conducted eight interviews, where seven of them were online video interviews, and the last one was via e-mail. To get diversified data, we mainly wanted to interview startups and partners that didn't cooperate with each other. But we also wanted to interview both the startup and partner in one match to check whether the responses were coordinated. They turned out to be, as the startup and partner had the same impression of the program and the collaboration with the other part in the match. Hence, the validity of that particular partnership is strengthened, which hopefully indicates that the other startups and partners interviewed would correlate with the other part of the partnership as well.

4.6 Ethics

When conducting a study, there are ethical considerations to be taken. Business and management research often involves human participation, and our thesis is no exception.

One needs to think about how to gain access to data and what possible ethical concerns can arise through the conduct of the project (Saunders et al., 2019). Saunders et al. (2019) state that "in the context of research, ethics refer to the standards of behavior that guide your conduct in relation to the rights of those who become the subject of your work or are affected by it". Following this, Saunders et al. (2019) outline different ethical principles that should be considered when conducting a study. The most relevant ones for our thesis will be considered now.

An important ethical principle is about "integrity, fairness, and open-mindedness of the researcher" (Saunders et al., 2019). This is about acting openly, promoting accuracy, and being truthful throughout the project. One should avoid deception, misrepresentation of data and findings, and partiality (Saunders et al., 2019). We tried to live up to this during the whole writing process. For example, we were open to the respondents about what the data gathered from them would be used for. We were also open to StartupLab regarding what they could expect from our collaboration with them.

Another important ethical principle is ensuring privacy, confidentiality, and anonymity of the data collected. Research is designed to answer certain questions, not to focus on the people who provide data to answer these (Saunders et al., 2019). The individuals and the organizations they represent should therefore remain anonymous. When collecting data from the respondents, it should be processed to make it non-attributable. In our study, we gave the different respondents code names to not reveal who was interviewed. We also transcribed the interviews shortly after the interviews took place and then deleted the recording after it was transcribed. The transcriptions will be deleted after the thesis is handed in and graded. This information was provided to the respondents before the interviews.

Voluntary participation in the project is another crucial ethical principle (Saunders et al., 2019). The respondents in our study could withdraw their participation at any time, as stated in the consent form sent to them. One of the participants had to cancel the scheduled interview just before the interview was to take place due to personal matters. This person did suggest postponing the interview to a later time, but the time didn't add up for us. Therefore we asked the respondent if it would be possible to answer some key questions via e-mail, which the respondent willingly accepted.

Next, a fundamental ethical principle is to analyze the data collected responsibly (Saunders et al., 2019). The data collected should not be interpreted in a certain way to fit the expected results. This is especially relevant in our study, as we are to make meaning of the respondents' answers. We have to use subjective judgment to understand what the respondent means, but this should not be done in a way that favors a specific outcome of the thesis' result.

Lastly, compliance from the respondents in the management of data is a vital ethical principle (Saunders et al., 2019). Many governments have passed legislation to regulate this matter. In Norway, the Norwegian Centre for Research Data is responsible for this, and our research project was therefore reported to and approved by them.

5 Presentation of findings

In this section, we will present our findings from the semi-structured interviews with partners and startups engaged in the 20tretti program. The presentation of findings is based on direct quotes from individual respondents, relationships and similarities between quotes from several respondents, as well as our overall subjective interpretation of these.

Although the respondents have spoken on behalf of their respective companies, we would like to emphasize that their statements are subject to personal reflections and experiences. Thus, linking the personal reflections to their companies' formal opinions should be done with caution. However, we may differentiate between partner companies and startup companies, since some respondents from the former represent companies with over thousands of employees, while respondents from the latter have 20 colleagues at maximum. Therefore, the personal opinions of startup respondents reflect their respective company's opinion to a much greater extent than for partner respondents. Further, the quotes used in the following sections are illustrative examples of our findings. The overall findings are based on the sum of all quotes. At last, we note that the quotes have been translated from Norwegian to English.

The structure of the following presentation of findings will be based on the three sub-questions related to our research question described in section 4.3. Note that the primary purpose of this chapter is to present our findings, while the sub-questions and research question will be further answered and discussed in chapter 6.

5.1 Question 1: More sustainable innovations?

In this section, we will present our findings that are related to the question: *Has there been delivered, or is it expected to be delivered, more sustainable innovations to the market as a result of the 20tretti program?*.

To begin with, this is an abstract and broad question with no simple, binary answer. To clarify and narrow its complexity, we repeat our definition of sustainable innovations. As described in section 2.3.1, our definition of innovation is a new product or service that is delivered to a market on a commercial scale. Although innovations can be measured in

Coll.			D.phase	Spes. pro.	Status	Dir. result
Startup 1	and	Partner 1	MVP	Yes	Ongoing	Yes
Startup 2	and	*another*	Conc. idea	Yes	Put on hold	Yes
Startup 3	and	*another*	MVP	Yes	Ongoing	Yes
Startup 4	and	Partner 4	MVP	Yes	Supplier	Yes
Partner 2	and	*another*	MVP	No	-	-
Partner 3	and	*another*	MVP	No	-	-

Table 5.1: Overview of collaborations.

several ways and take different forms, we do not consider prototypes or MVPs (Minimum Viable Products) as innovations but focus on the end product. In this project, we are examining the expectation and potential for these prototypes and MVPs to become fully commercialized and further if the 20tretti program is responsible for a possible increased expectation. Furthermore, in order to become sustainable innovations, these innovations need to be developed with an objective of solving climate-related challenges.

Table 5.1 presents an overview of the investigated collaborations in 20tretti and some findings summarized in the columns. To clarify, the abbreviations are explained below:

- *Coll.* = Collaboration
- *D.phase* = Development phase of the startup
- *Spes. pro.* = Collaboration resulted in a specific project?
- *Dir. result* = Direct result of 20tretti?
- *Another*= in collaboration with a partner/startup not in our sample
- *Conc. idea* = Conceptual idea
- *Supplier* = Supplier relationship.

5.1.1 Successful projects

The 20tretti program aims to create collaborations between startups and corporates to further engage them to develop products or services that contribute to the partner's climate headache. Thus, it is natural to start by presenting what respondents tell about the projects 20tretti has facilitated, how far they have come, and if the projects are still running. Our findings vary, from some respondents telling about projects put on ice and others about projects being realized.

As noted in table 5.1, startup 1 and partner 1 were partnered up in 20tretti and our findings

show that their collaborative project has been a success so far. Startup 1 emphasizes that the collaboration with partner 1 has resulted in a project that has given them finances to develop their product further.

> *It [20tretti] resulted in a project that gave us finances throughout the year, eliminating the need to reach out to investors for capital. And that is very positive for us as an organization. It gives us safety and confidence to develop and finalize a technical product that will become ready for the market and will be tested in this project.* - Startup 1

Currently, this startup has a well-developed prototype, but its functionality is limited to small-scale systems. According to the respondent, their next step towards market success is to scale up and test their product on larger systems. For that purpose, the startup states that it is essential to establish partnerships with companies who have access to the market, and test and validate its product in collaboration with such companies.

> *The [next step] is probably to develop a partnership with those who have access to distribution, which for us means - access to the market. [...] So we are probably more - the next step for us is to establish contracts that enable us to increase volumes. [...] And now they [the partner] are facilitating a large test and developing project that in many ways are making us ready for market success* - Startup 1

Further, the respondent from partner 1 shares the same view on the partnership and stresses that their contribution is related to testing and validation of the startup's product.

> *The first that comes to mind is that we provide them a platform where they can test their solution, and of course funding to do so. [...] We might also be able to assist and develop their solution to become ready for customers at a later stage [...]. We give them a platform where they can demonstrate their solution to others [...] and the validation proof they get by being on our website.* - Partner 1

The collaboration between startup 1 and partner 1 is a great example of a successful partnership that, according to what is outlined above, most likely increases the probability for startup 1 to deliver its product to the market in a commercial scale. Still, we should consider the possibility for this collaboration to take place independently of 20tretti. Although 20tretti engaged the partner to define and communicate its climate headache, the partner's problem, as well as the startup's prototype, existed nonetheless. Therefore, we have studied if they think the project would have been realized if it wasn't for 20tretti, or if they consider it likely that the project would have taken place at one point anyway.

An interesting aspect with the collaboration between startup 1 and partner 1, is that they had prior knowledge about each other and had been collaborating before 20tretti. Their prior relation seems to have influenced their willingness to cooperate and partner 1 clearly emphasizes the value of knowing the startup they are establishing collaboration with. However, their previous projects have not been of the same size as the ongoing project, as startup 1 defines the previous projects as *smaller projects*.

> *[...] and we did know about *startup 1* from previously and knew there were people there that have delivered results before [...]. To know that they have achieved something previously is quite important for us.* - Partner 1

> *[...] because we have worked with *partner 1* previously on smaller projects more or less for several years [...]* - Startup 1

Despite their relation from previous projects, both state that the ongoing project is a direct result of 20tretti that would not necessarily have taken place if they did not participate in the program.

> *Yes, I would say [that the project is] a direct consequence [of 20tretti]. We could also have applied for *other supporting schemes* ourselves without StartupLab and things like that, so we could have enabled this project. But this project isn't something we necessarily would have considered without the program [20tretti].* - Partner 1

> *The project] was a direct outcome of 20tretti. [...] We have previously worked with *partner 1* where we started with the development of the system and tested it with them. This [20tretti] was a way to take it even further* -Startup 1

Finally, with regard to the question that was asked initially, startup 1 also expresses that the collaboration with partner 1 has increased the probability of successfully deliver their product to the market, highlighting the opportunity to test and demonstrate their product as a key enabler for this.

> *It [the collaboration] has increased the probability [for the product] to succeed, definitely. I would absolutely say so. It [the collaboration] does also give us a good test arena and demonstration arena, a good marketing tool to obtain more customers. So it has been very good.* - Startup 1

5.1.2 Projects put on hold

Furthermore, there are also respondents telling about projects that started promising but lost progress and have been put on hold due to various factors. Firstly, several partners single out timing as a main factor for projects being put on hold or cancelled. The partners

participating in 20tretti are large organizations and the capacity for innovation projects varies. For instance, partner 3 explains that their most hectic period is from October to May and that it is challenging to run innovation projects in this period.

> *[...] so to find time to go further and get it done in a proper way is very challenging when we are in the middle of that period. So it [the project] is put on ice.* - Partner 3

Another partner holds the Covid-19 pandemic responsible for slowing down the progress.

> *[...] so I don't think they [collaborative startup] have given up on us completely, and we have probably not given completely up on them either. It is more about timing, bad timing because of Covid.* - Partner 2

Secondly, some projects were put on hold because of strategic reasons. Partner 4 stresses that their collaborative startup became a more traditional supplier, rather than an innovation partner.

> *It has been a long discussion whether we should go for a more commercial development collaboration [...]. We have put that on ice, because we have a strategy where we [...] try to be supplier independent. We do have a collaboration with them, and we have bought *products* from them and tested it, so that is the status now. It is more a customer-supplier relation rather than an innovation partnership.* - Partner 4

As noted in table 5.1, we have also been interviewing the startup that collaborates with partner 4. Our findings from the interviews indicate that this startup had a quite well-developed product and technology that was more in search of establishing supplier contracts with business partners, rather than developing their product further in collaboration with a partner.

> *Our development has been largely independent of *partner 4*. If the product becomes a market success, the collaboration with *partner 4* is only a tiny part of the explanation. But the collaboration can become important for further growth and development of *our subsidiary company*. We are still in dialogue with *partner 4* regarding a strategic collaboration and opportunities for a significant partnership with *our subsidiary** - Startup 4

5.1.3 Products and services in early development phases

The findings we have presented so far concern established products and services at prototype stages, and how 20tretti contributes to the development of these. Further, an interesting topic to look into is whether the program also influences products or services

at earlier development stages and potentially transforms novel ideas into more specific conceptual ideas and prototypes.

In general, our findings show that most collaborations consist of startups having well-functioning prototypes or MVPs, seeking partnerships that enable them to scale up and test their solutions in markets. However, there is one collaboration that differentiates from the others, in terms of the current stage of development. According to the respondent from startup 2, none of the climate headaches fitted their core product, but one of the climate headaches reminded the startup about another idea that they had been working on earlier on a conceptual level.

> *I applied because I thought more of these big partners would identify problems regarding *a climate issue* [...]. But none of them had identified this issue, so I thought "OK, whatever, I'll just withdraw the application". But then another idea of mine came into my mind that suited the climate headache.* - Startup 2

Consequently, startup 2 established collaboration with the partner that defined the respective climate headache. The collaborative project is a great example of 20tretti facilitating new innovations that could potentially have been forgotten or deprioritized. In this project, the startup and partner joined forces to receive funding from a governmental supporting scheme for sustainability innovation projects but were not chosen among the other candidates.

> *So we worked for a while with the concept and the match was good. The interest from *the partner* was very big, and we met with them and *other relevant companies in the sector*. Then it culminated into an application for *a financial supporting scheme* [...]. When the application turned out to be not good enough, we didn't get any further in the process. And then *the project* was put on ice. So now we are working fully with *the initial idea*, but later we might pick up the *second idea* again.* - Startup 2

As a result, the project was put on hold and it is for that reason challenging to say whether this idea will be developed into a commercial product or not. Nevertheless, startup 2 states that the participation in 20tretti has notably increased the probability for launching this product successfully at the market in the future.

> *Yes, [the probability for the product to be successfully launched] is pretty large [because of the participation in 20tretti], because 20tretti was an important factor for the *second idea project* to accelerate. [...] So it lays there, ready to be picked up again at a later stage - we will most likely do it sometime* - Startup 2

5.1.4 Acceleration of collaborations and innovation processes

As we have presented earlier, the collaboration between startup 1 and partner 1 is a direct result of 20tretti that would not necessarily have been realized without the program. Going more in-depth, our findings show that it is likely that other 20tretti projects could have taken place at some point in the future. However, several respondents express that 20tretti accelerated the processes.

> *[20tretti] was perhaps an enabler factor. I did slightly work on the *idea* in the summer and considered going further with it before 20tretti came on my radar. But it [20tretti] was maybe an accelerator to speed it up.* - Startup 2

> *[...] I would say that 20tretti made it happen this fast. I mean, they would have appeared on the radar at some point anyway, but we didn't know about them before 20tretti. [...] 20tretti has pushed the process to start earlier, I think.* - Partner 4

5.2 Question 2: The theory behind the innovation methodology

In this section, we will present our findings related to the question: *To what extent is the theory behind the innovation methodology responsible for more/less innovations?*. By *the theory behind the innovation methodology*, we address the combination of design thinking and systems thinking described in section 2.3.4. More precisely, we will present the findings that are based on the respondents' experiences with the use of systems mapping in the problem framing phase and design thinking approaches in product development, and how such tools influence a potential increased probability for more sustainability-oriented innovations.

The purpose of applying systems mapping in the problem framing phase of the innovation processes, is to put the partners' operations into a greater context and thus, identify their externalizes and climate impacts. By having precise and well-defined problems that incorporate sustainability aspects, 20tretti aims to engage startups to develop sustainability-oriented innovations in collaboration with the partners. Therefore, it is interesting to examine how systems mapping influences the climate headaches that were defined.

5.2.1 Defining climate headaches without systems mapping

In order to examine the role of systems mapping, we have studied how different the partners think their climate headaches would have been without the use of systems mapping and what contributions the technique provides them. Firstly, respondents express that the technique helps them get an overview of their value chain and more easily and thoroughly identify their impacts throughout the chain. Although several respondents state that they have been reflecting about their externalities before, they also express that the use of systems mapping increased their awareness of them and made it easier to prioritize improvement measures.

> *I mean, when you use that method [systems mapping] you might be able to go a bit deeper, I think. You become able to think deeper in the value chain, compared to when just think freely.* - Partner 4

> *[...] we had already been reflecting on these things. [...] It was useful to visualize it, you could say. I think that it was nice for us who don't necessarily have a lot of direct emissions, it is our value chains we must get an overview of to know how we can reduce the footprint* - Partner 2

Furthermore, the partners state that they do not necessarily believe that the climate headache would have been particularly different if they had used other methods. However, they do believe that systems mapping makes the justification of the headache stronger and emphasizes the technique's ability to provide a deeper understanding of a problem.

> *I don't know how different it [the climate headache] would have been. We would probably have ended up pretty much the same place [...] but what I think is interesting is the reason behind why we ended up where we did, and the perspective on why we wanted to solve the problem. [...] It is also a bit more positive, [...] that we formulated the "why" more thoroughly.* - Partner 1

Moreover, partner 3 expresses similar experiences with systems mapping and states that the technique helped them become more certain about the importance of the problem, while partner 1 also expresses that the complexity became more clear and interpretable.

> *One becomes more aware of the time horizon when working like this, compared to if you just throw out a problem. [...] It is a way of becoming certain that what you assume is a problem actually is a problem that is worth spending time on.* - Partner 3

> *We used the entire table and drew and saw that *our climate problem* was actually much bigger and more complex than what we often might think, or at least how we talk about it.* - Partner 1

As presented in the sections above, our findings show that the use of systems mapping in the problem framing phase does not necessarily make the defined problems much different than without the technique. However, systems mapping seems to increase the awareness and understanding of the problems, which may provide new perspectives. Further, these perspectives could help partners identify new externalises and impacts, as partner 3 expresses.

> *We had seen the problem from another perspective, a more logistics perspective, but when we dug deeper into the problem, we saw that we potentially inflict *the city* a lot more driving because we are located where we are.* - Partner 3

5.2.2 Experienced complexity with systems mapping

However, as it has been mentioned in section 3.2.2, the techniques within systems thinking are often complex and time-consuming, which also concerns systems mapping. Although systems mapping is based on a more user-friendly and intuitive approach, which only requires a paper, a pen, and people with knowledge about the investigated problem, some respondents report that it was challenging to both explore the problem and define a climate headache within the given time frame.

> *[...] and then we just started drawing, I mean, we could have been sitting there for three days just drawing, unfortunately. [...] The time limit was a bit short, it was a bit like "now you are going to draw and then you will make a climate headache out of that". So we did not understand how we were supposed to be able to do that [...]* - Partner 1

Moreover, using systems mapping to define a proper climate headache requires adequate knowledge about the respective company's environmental impacts. One needs to have qualitative insights and understanding of the entire value chain and where the impacts are located, such as carbon emission, material use, and production processes. In addition, the partners participating in 20tretti have a great number of suppliers which makes mapping the total impacts quite comprehensive. One partner highlighted this challenge, who found it difficult to take all these aspects into account and missed some guidance regarding this.

> *But in the [systems mapping] process, there was not much climate expertise. There was a lot of talk about innovation methodology and thinking about systems and stuff like that, but there was nobody who could help us with like "OK, where are your emissions? What measures would really help?". And then it was up to the ones sitting there to define a headache that wasn't necessarily very ambitious.* - Partner 2

Our findings show that the partners got sufficient guidance on how to conduct a systems mapping analysis. However, the partners were not given any instructions to bring people with expertise and competence within environmental impacts. This is an interesting aspect that concerns the sustainability component of the program. In order to create sustainable innovations, one needs to ensure that the problems defined are anchored in actual climate problems. Thus, we stress that it is crucial that partners also bring employees with knowledge of environmental impacts.

5.3 Question 3: The practical application

In this section, we will present our findings related to the question: *To what extent is the practical application of the innovation methodology responsible for more/less innovations?*. As described in section 2.3.4, the practical application refers to corporate-startup collaborations and how these collaborations influence the number of sustainable innovations delivered to the market.

In general, startups and partners express positive experiences regarding the collaborations with each other. For instance, several partners state that collaborations with startups function as an eye-opener, inspire them to enhance their innovative skills, and challenge an established and often traditional culture within the organization. However, it is uncertain how these things influence the actual probability of new sustainability-oriented innovations. Therefore, we will in the following sections elaborate on how the aspects related to corporate-startup collaborations specifically contribute to the probability of delivering more sustainability-oriented innovations to the market.

5.3.1 Solving climate headache in-house

To begin with, the objective of the 20tretti program is to foster sustainability-oriented innovations and there are several approaches to be chosen in achieving this. Promoting innovation by facilitating collaborations between corporates and startups is one of many approaches. An alternative to corporate-startup collaborations could be internal development of innovation within the companies, meaning that partners define the climate headache and solve them with their in-house resources. To inspect this further, we have studied the partners' thoughts concerning such an approach.

> *Yes, it would probably be possible [to solve the climate headache in-house], but it would be much more difficult to allocate time and resources to work with it. [...] We are a very operational-oriented organization [...] so all these types of [innovation] initiatives are pretty far down on our priority list, [...] so this has definitely helped us to put it higher on the agenda and also to free time and resources to work with it.* - Partner 4

As partner 4 emphasizes, it may often be challenging to allocate time and resources to innovation initiatives when the day-to-day operations require most of the time and resources. This view is also shared by partner 1, who also stresses that collaborations with startups help them prioritize innovation projects.

> *[...] we work at lot with innovation and development, and try to think new ways internally in an organization that maybe doesn't have innovation at the top of the agenda [...]. So for us to get some inspiration and help and a push to learn systems thinking, give a lot of motivation to test new things. So I don't think we would have done this [collaborative project] if we didn't participate [in 20tretti].* - Partner 1

5.3.2 Identified advantages

Furthermore, several advantages with corporate-startup collaborations have been highlighted through our interviews. Firstly, startups are established because they have identified a demand or a problem within a market and aim to develop products or services that provide solutions to such demands or problems. In order to succeed, they need to fully understand the problems they are seeking to fix. In 20tretti, the partners are the problem owners and have comprehensive knowledge and in-depth insights about the problems defined through the climate headaches. This knowledge enables startups to obtain a greater understanding of the problem and to develop a product or service in close cooperation with the problem owner.

> *I also think they [the startup] benefit our knowledge to the actual problem statement. They develop a kind of product, but I also believe that to come with this knowledge around the problem is very important* - Partner 1

Secondly, several startups have emphasized the need for scaling up their products or services as the next step towards achieving commercial market success. According to respondents, startups have the greatest need of larger partners in this phase due to partners' established customer portfolio and their access to the relevant markets. As described in section 5.1.1, startup 1 state that testing their solution in larger systems is

essential for further development of their product, and that their collaborative partner enables this. Compared to startup 1, startup 2's product is not considerably developed but, nonetheless, the respondent states that the need of a partner will become greatest when their product is ready to be scaled up.

In order to be able to scale up, startups need to test and verify their products in larger systems and apply the feedback received for further improvements. Several startups highlight the opportunity to test their product as the core motivation for their participation in 20tretti and that the program has given them valuable feedback.

> *We wanted to improve the business development, and we wanted to test our concept on professional actors* - Startup 3

> *It [the participation in 20tretti] has given important input and confirmation that the market needs our solutions and a technology suppliers as *us** - Startup 4

Moreover, the value of receiving feedback on their product is also empathized by startup 1, who draw attention to the continuous input and validation they receive in their collaborative project with partner 1, as well as other partners participating in 20tretti.

> *[...] We use this project to validate that the assumptions we have made, regarding design and solution, are correct; that we are good. So here we get continuously input from the partners, and so far it has been a success* - Startup 1

Thirdly, a more general advantage with corporate-startup collaborations that the startups highlight, is the benefit of more effectively get in touch with larger companies. In addition to establish specific partnerships to develop their products, several startups stress the opportunity to meet a great number of partners as one of the major motivational factors to participate. These partners may become relevant for future projects or partnerships.

> *[...] here we got a convenient platform for sales pitch towards several partners in a quite simple way. We did proceed with *partner 1*, but we also got the opportunity to talk to other relevant companies.* - Startup 1

Further, startups 3 emphasize that they more easily obtained attention from the partners than they normally do, as well as getting access to people from different departments within the companies.

> *The partners who participated are companies that are exiting for us to talk to. [...] It is an advantage for a startup like us that the people from the partners represents different business areas within the the company, so that we get a broader access to the companies, compared to if reach out to them them directly.*

> *And also, we know that the people from the partners are people willing to listen to us.* - Startup 3

5.3.3 Identified challenges

On the contrary, the respondents have also highlighted some disadvantages and areas of improvement in 20tretti, related to corporate-startup collaborations. Firstly, some partners experienced that many of the startups did not specify their proposed solution to the climate headache. The overall goal of the program is to solve climate-related challenges and in order to create collaborations that actually contribute positively towards this, the solutions need to address the given challenges specifically.

> *We thought they [the startups] would adapt their solutions a bit more to us than they did, so we were a bit disappointed by that. A couple of times we thought "Have you read the climate headache at all, or are you just pitching your company?"* - Partner 1

Moreover, partner 4 experienced the same at the final event *Collab* in Oslo, where selected startups pitched their solutions to all partners attending.

> *And I thought that when we were in Oslo, they [the startups] would pitch their solutions to the climate headaches, but it was more about pitching their company to all those who were present. So it became a bit, what should I say - a bit unnecessary this part of the program.* - Partner 4

Secondly, the practical principles of the innovation methodology are based partners defining problems and engage startups to develop solutions to these. According the fundamental idea, startups' solutions will be developed on basis of the defined problems in collaboration with the partner. This means that the startups applying at the partners' climate headaches need to have products or services that are not fully developed and able to do minor or major adjustments to fit the headaches. However, this fundamental idea has its realistic limitations and challenges which will be further discussed in chapter 6. For now, we will present the partners' views on how developed the startups' products or services should to be.

On a scale from immature startups with conceptual prototypes on the left side, to mature startups with well-developed products on the other, partners' views are located on each side of this scale. To start with, partner 2 expresses that they expected to meet startups and create a solution to the climate headache together. In contrast, they experienced

that the startups had well-developed products and that there were was no connection between the headache and the solutions pitched by the startups. This aspect is related to what was described in the first challenge, that startups' solutions were not specified to the climate headaches.

> *There was not any innovation methodology or something like that in the process where a solution was created. It was more like we had come up with a problem and they had a solution [...] and then it was like "how well do they fit together". And then there were done some minor adjustments, [...] but it was not like a solution was made based on the problem. No, it was not. So the connection between the solution and the problem became a bit - it wasn't very merged. [...] I mean, the point with this, as I experienced it, was that one would meet and create something together that can give innovation, but it was more like that each part had been sitting by themselves and thought independently.*- Partner 2

On the other side, the respondents from partner 1 and partner 4 provide an opposite view, stating that they were worried about only meeting early-phase startups. The respondent from partner 1 stresses that they find it challenging to enter collaborative projects with startups with conceptual ideas, due to unpredictability and uncertainties of how a pilot project will actually turn out.

> *I also think that it has to do with in which phases these startups are. We saw that some of them were in very early phases. They were in the idea-phase, and then I don't think that pitching to *us* is ideal. That being at a bit more developed helps because when you just have an idea, it is difficult for us to understand the solution should be put into life in a pilot project in some months.* - Partner 1

Moreover, the respondent from partner 4 also states that they were in search of more established startups and admits that the collaboration with startup 4 is more a commercial partnership, rather than an innovation project.

> *We were a bit afraid that the applicant would be two teenagers with theirs caps backwards and a Mac with a great idea. We feared the all we ended up with was a lot of nonsense on a paper, bu *startup 4* is an established company with the an established funding. So they didn't necessarily search for a lot of capital, they were looking for a partner with access to the market. [...] They probably see us as a partner that accelerate the market launch of their product, right, because they have an almost fully-developed product* - Partner 4

Despite the concerns of partner 1 and partner 4, both ended up with quite successful projects and one could therefore discuss the appropriate level of maturity for startups in corporate-startup collaborations, given the overall purpose of fostering innovation. This

will be discussed more in depth in chapter 6.

6 Discussion

This chapter will discuss the findings presented in the last chapter and put them into our theoretical and practical context, focusing on systems thinking, design thinking, and corporate-startup collaborations. As defined in our research question, our main objective is to examine how the innovation methodology that 20tretti applies influences the probability for startups to deliver sustainability-oriented innovation to the market. This may be answered from both the startups' and the partners' points of view.

In general, from the startups' point of view, the research question is answered based on their reflections and beliefs about whether their product will commercially reach the market as a result of their participation in 20tretti. From the partners' point of view, it is answered based on their thoughts and statements about whether they believe that the climate headaches will be solved as a result of the startups' solutions.

We stress that the time perspective sets constraints for our findings. As noted in section 4.2.3. about the challenges regarding the optimal research design, it would be easier to give a clear answer to the research question in for instance five years, since the more long-term impacts of the program are currently hard to assess. Today, less than a year since the program took place, some respondents have established collaborations that have led to specific projects, some have put collaborative projects on hold, while others are still in the discussion phase with their matched partner/startup. In other words, it is still uncertain what effects the collaborations will have on future sustainability-oriented innovations.

6.1 Overall discussion

6.1.1 The products' development phases of the participating startups

To begin with and as presented in section 5.1.3, there were differences in how developed the products of the participating startups were. Some startups applied to climate headaches with novel ideas or conceptual prototypes, while others applied with well-functioning MVPs. As explained in chapter 3, a common framework within design thinking is the

five-step iterative process, and based on this framework, several startups were in the fifth phase, *Test*. In contrast, the partners' definition of climate headaches is associated with the two first phases of the framework.

This gap within the innovation process may sound problematic, given a fundamental idea of developing products or services on the basis of partners' defined problems. If the main objective is to use corporate-startup collaborations to develop innovative solutions from scratch, startups and partners should establish collaboration when both are in the early phases of innovation. An approach like this could, to a greater extent, put the climate headache at the center of innovation. In 20tretti, the purpose is to let the partners define the problem and then engage startups to join the innovation process after that. Using figure 6.1 as an illustrative picture, this means that the startups enter the innovation process in step 3, *Ideate*, after the partners have defined the headaches in steps 1 and 2, *Empathize* and *Define*.

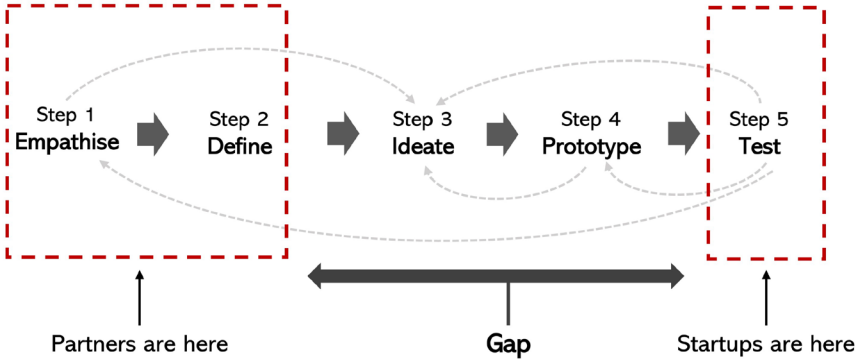

Figure 6.1: Gap in development phases of the innovation.

Enabling such collaborations requires that startups are able to do potentially major adjustments to their products or services. Therefore, startups with well-developed prototypes or MVPs may not be capable of such. In contrast, one may benefit startups with products or services earlier in the development phases.

On the other hand, one may argue that the purpose of 20tretti is not necessarily to make partners and startups create solutions together. It is not the collaborations in themselves that are the goal but their outcome, namely sustainability-oriented innovations. Thus, if the startup offers a perfect solution to the partner's climate headache, which results in an innovation, the program fulfills its goal. As presented in section 5.1.2, startup 4 had a well-developed product that matched the climate headache of partner 4. In this

case, their collaboration did not result in a project where the main goal was to develop the startup's product. Nevertheless, the collaboration resulted in a project that may influence startup 4's possibility of success with their product, which again could foster a sustainability-oriented innovation.

Furthermore, several partners have expressed different views on how developed they prefer the startups' products should be, as presented in section 5.3.3. Some partners stated that they were searching for startups that could build a product or service from the beginning based on their climate headache, while others were searching for startups with more developed products that could fit more directly into their defined problem. There is no obvious and correct answer to the question of which approach is most convenient. However, studying which collaborations that became most successful, we find that startups with products or services in MVP phases were those that had the greatest rate of success. Those startups needed to test and verify their product on larger systems, and several partners enabled this. For instance, startup 1 had a well-developed MVP and stated that the next step towards market success was establishing partnerships with companies with access to their targeted market and then testing and validating its MVP in collaboration with such companies. Partner 1 enabled this, and as presented in section 5.1.1, they established successful collaboration.

In general, the discussion concerns the realistic limitations of a program such as 20tretti. Creating products from early development phases in the innovation process may be a precise approach to create sustainable innovations that address the problems defined by the climate headaches. However, there will always be risks involved when establishing partnerships. Partners allocate precious time and a considerable amount of money to collaborative projects with startups and need to be somewhat confident that the projects will result in something beneficial to their business. For that reason, when partners choose startup(s) to collaborate with, it is reasonable to believe that they avoid choosing newly established startups with more conceptual ideas than functioning prototypes. In contrast, for startups with an established organization, a trustworthy and solid business model, and a well-developed prototype, partners may consider the risk of wasting time and resources as relatively small compared to the potential benefits they may gain in a partnership.

Moreover, considering the innovation methodology, the design thinking component of the

methodology becomes less prominent when startups enter collaborations in 20tretti will well-developed prototypes. As explained in section 2.3.4, the fundamental principle of the combination of design thinking and systems thinking implies that design thinking techniques are applied in the phases after the problem definition, namely steps 3, 4, and 5, *Ideate*, *Prototype* and *Test*. As already noted, several successful collaborations include startups that need to test their solutions, which implies that they are in the fifth step. Since design thinking approaches allow you to go back and forth in the innovation process, startups should be able to go back and adjust their solutions based on the climate headache. However, our findings show that when partners establish collaborations with mature startups, the collaboration focuses more on developing the startup's product rather than solving the specific climate headache.

6.1.2 The problem definition's role in the partnership

Continuing the discussion regarding the role of the climate headache, there have been several partners emphasizing that they hoped startups would adjust their solutions to their climate headache more than they did. As presented in section 5.3.3, some partners experienced that many of the startups applied for their climate headache with general solutions that did not reflect the defined problem's challenges. In order to foster innovations that also incorporate sustainability and contribute to the challenges of the climate crisis, the climate headache needs to play an essential role. The climate headache leads the innovation in a direction of sustainability, and if it is forgotten during the process, the sustainability aspect could weaken.

One may also argue that as long as the startups are developing products or services that in general contribute to solving environmental and climate challenges, regardless of their participation in 20tretti, the climate headache of their collaborative partner does not matter. In terms of creating sustainability-oriented innovations, it is irrelevant whether the collaborations generate innovations that solve climate headaches or other sustainability challenges. In general, we believe that this is a valid argument. However, considering the most efficient approach to help startups deliver sustainability-oriented innovations to the market, we believe that solutions that specifically solve partners' climate headaches are most effective. In such cases, startups will to a greater extent benefit from partners' knowledge about the problem they are aiming to solve. Having comprehensive knowledge

and an in-depth understanding of the problem one seeks to fix is fundamental in all innovation processes. Also, startups provide more value to the partner by specifically solving its defined problem. An equal trade-off between the partner's costs (time, resources, money) and its returns (contributions to climate-related challenges in their business), will most probably positively influence the partner's willingness and motivation to collaborate.

Our findings show that 20tretti facilitates an effective arena to foster innovation and promote cooperation between large companies and startups. The program gathers the innovation society and includes the companies to participate and connect with entrepreneurs. In addition, to create specific collaborative projects, startups get the opportunity to meet potential partners and customers that may become valuable to their organizational development. Indeed, this may increase the probability for them to successfully deliver their products or services to the market in the future, but in order to push them to solve climate challenges precisely, the climate headaches need to be the main focus of the program. We therefore stress that the climate headaches need play an essential role and not be overlooked by the other benefits of 20tretti.

This discussion is also related to what is theoretical versus practical feasible. In an ideal world with thousands of startups applying for the partners' climate headaches, there would most likely be solutions that precisely fit each climate headache. More realistically, there is a more limited number of startups relevant for 20tretti, and thus, it is not certain that all partners will find startups that address their challenge. This leads us to the discussion about how narrow the partners' climate headaches should be.

6.1.3 Narrow versus general problem definitions

In 20tretti, some partners defined quite specific and narrow climate headaches while others defined more broad and general ones. In our opinion, there are advantages and disadvantages to both approaches. To start with, a specific climate headache may address a partner's problem to a greater extent than a more open one. By narrowing the climate headache to a particular problem one wishes to fix, there is also a greater probability that the climate headache, as a whole, will be solved. On the other hand, narrowed headaches reduce the scope of startups eligible to apply since fewer startups will find the problem relevant for their respective product or service.

In contrast, a more broad and general climate headache will allow for a larger variety of solutions and thus, invite more startups to apply with their products or services. For that reason, the probability for partners to find matching startups may increase. However, startups' proposed solutions will most likely not solve the problem as a whole. These solutions may be valuable contributions but will most likely only partly solve the climate headache.

Again, the discussion concerns what is theoretical versus practical feasible. Given the fact that there is a limited number of startups applying for participation in 20tretti, broad climate headaches may lead to several collaborations than more specific headaches. However, the climate headaches form the foundations of the collaborations. To actually solve the sustainability challenges, we believe that partners should be careful of defining too broad and general headaches. One way to see it is that broad climate headaches are beneficial for establishing collaborations, while specific headaches increase the importance and focus of the climate challenge.

Figure 6.2: Broad versus specific climate headaches

6.1.4 Adjusting the problem after establishing collaboration

Furthermore, regarding the climate headache and how to define it to attract a sufficient number of startups, we may also discuss whether the headache should be adjusted according to startups' proposed solutions. As presented in section 5.3.3 and discussed above, partners experienced it challenging to consider startups that did not adapt or specify their solutions to their climate headaches. Similarly, we may discuss it the other way around, namely, the advantages and disadvantages of adjusting the climate headache to the startups' solutions.

Based on design thinking's non-linear principles, innovators can go back in the process and change the problem definition according to new findings in later phases. Following these principles, one may argue that partners also should change their climate headaches when startups propose solutions that do not perfectly fit.

However, systems mapping is applied in the two first phases of design thinking to incorporate sustainability aspects into the defined problem better. The outcome of systems mapping, namely the climate headache, sets the sustainability-oriented direction for the innovation process. Enabling partners to change their climate headaches may risk these aspects to weaken. To develop innovations that precisely aim to solve climate challenges, we believe that the system perspective of the climate headaches needs to maintain its focus. Yet, if the partners use systems mapping toolkits when changing their climate headaches after establishing collaborations with startups, the sustainability elements may remain. Nevertheless, we consider it doubtful that these toolkits will be applied and stress that the adjustments of climate headaches may occur at the expense of maintaining the climate orientation.

On the other hand, enabling partners to change their climate headaches could result in more successful collaborations between partners and startups. As discussed in the previous subsection, a narrow climate headache may lead to fewer partnerships than the more general ones since several startups identify their solutions with general headaches. By enabling partners to change their headaches, more startups may find the climate headaches relevant, and thus, more collaborations may become feasible. Although we have identified some collaborations where the startup's solution perfectly matched the partner's headache, other partnerships are based on solutions that partly fit the climate headaches. For instance, the collaborative project between startup 2 and its partner, presented in section 5.1.3, became a reality due to the adaptability of both parties. This collaboration exemplifies that partners should adjust their climate headaches in to create collaborations.

6.1.5 Preparation for partners in the problem framing phase

As outlined in section 3.4, complexity and time requirements are major challenges with systems thinking techniques. Our findings show that despite the more user-friendly and intuitive approach of systems mapping, several respondents reported that they found it challenging to conduct such analysis within the given time boundaries. Naturally, one way to overcome these challenges is to spend more time on the analysis, which leads us to the discussion of whether the partners should prepare for the climate headache workshop.

As described in section 2.2, StartupLab gathered the participating partners at a two-day

workshop, called *Ideate*, with the purpose of applying systems mapping to define climate headaches. At this workshop, there were no requirements for neither preparations nor prior knowledge of systems mapping. Therefore, a proposed suggestion is to require or recommend the participating partners to prepare for the workshop. Such preparations would involve that they should start the process by reflecting on the firm's role within its operating system to identify potential climate challenges. This could reduce the experienced complexity and enhance the overall quality of the headaches.

Firstly, there may be challenging to require participants to prepare because one requires them to spend time in advance. Most of the people participating in the workshop have limited time available due to their day-to-day duties in their respective companies. Since they are already sacrificing two working days to attend the *Ideate* workshop, they may find it somewhat overwhelming to use even more time.

Secondly, if the participants do prepare, we believe that it is most likely that they would enter the *Ideate* workshop differently prepared. Hypothetically, some might have spent several hours on preparations while others less than an hour. In addition, since there are several participants from each partner firm, preparations require coordination between the employees, which has its practical challenges when the available time is already limited.

Thirdly, we stress that the systems mapping approach to the problem definition could vanish if participants prepare. An essential element of 20tretti is to use systems thinking to identify a problem. Our findings show that most partners were unfamiliar with systems thinking techniques and needed guidance on conducting a proper systems mapping analysis. StartupLab should guide the participants through the process to ensure that the climate headaches are anchored in systems thinking principles.

Furthermore, although StartupLab instructed partners on how to conduct a systems mapping analysis, several respondents stated that they still found it challenging to map all the externalities of their company, as presented in section 5.2.2. The climate headache may become too vague without proper knowledge about the company's supply chain, operations and production processes and how these influence the total environmental impacts. In our view, StartupLab should encourage partner firms to bring employees with in-depth insights and competence on the firm's environmental and climate effects.

At last, one obvious way to increase the time boundaries of the problem definition process in 20tretti is to spend one more day at the *Ideate* workshop. However, our findings show that the partners were satisfied with two days and stated that they find it challenging to allocate more time, considering their other obligations at work.

6.2 Discussion and conclusion of sub-questions

In this subsection, we will specifically discuss and conclude the sub-questions that will form the concluding remarks of our research question.

6.2.1 Q1: Has there been delivered, or is it expected to be delivered, more sustainable innovations to the market as a result of the 20tretti program?

Firstly, because of the limited time frame of our project, we do not yet have enough data to state whether there have been delivered more sustainable innovations to the market as a result of 20tretti. As described in chapter 2, we consider new products or services as innovations the moment they become commercialized in a market. Achieving commercialization in a market takes time. Hence, we have tried to examine the long-term impacts of the program to assess the probability of such innovations to become commercialized.

Consequently, through the respondents' reflections and statements, as well as our interpretation and analysis of them, we have the empirical foundation to tell something about the expectations for new sustainable innovations. In general, our findings show that 20tretti has generated several projects that specifically contribute to realizations of developing products and services. These projects are also considered to be a direct outcome of the program that would not necessarily have taken place without 20tretti's initiative.

Several collaborations between partners and startups were established in 20tretti, but not all resulted in specific projects. However, there were a variety of reasons why projects failed and neither the program nor the innovation methodology should be held responsible for all failures. Setting aside uncontrollable factors, such as timing and occasional limited

resources at the partner companies, we believe that 20tretti contains several essential elements that significantly boost innovation processes.

To conclude sub-question one, our research shows that it is expected to be delivered more sustainable innovations to the markets as a result of 20tretti.

6.2.2 Q2: To what extent is the theory behind the innovation methodology responsible for more/less innovations?

The theory behind the innovation methodology, namely the combination of systems thinking and design thinking, sets the sustainability direction and ensures that the defined problems are anchored in real-life climate challenges. The use of systems thinking in the problem framing phase pushes partners to look deeper into their value chains and identify challenges that they may fail to observe.

As discussed in the sections above, several interviewed startups had quite developed prototypes. Consequently, there has been challenging to assess the impacts of the design thinking component of the theory, as this component becomes most relevant in the earlier development phases of a product or service. Although we aimed to assess the combination of design thinking and systems thinking, our findings mainly emphasize how systems thinking has influenced new innovations.

To conclude sub-question two, compared to the value contributions of the practical application (corporate-startup collaborations), we do not believe the combined model of systems thinking, and design thinking provides any significant value to the product or service development in itself. Thus, we do not consider the theory particularly responsible for the increased expectations for new innovations. According to our findings, the use of systems mapping in the definitions of climate headaches has not fostered new sustainable innovations but has inspired startups to apply their products for sustainability purposes. Also, it has been an essential contributor to identifying climate challenges within partners' operations and prioritizing time and resources to solve them.

6.2.3 Q3: To what extent is the practical application of the innovation methodology responsible for more/less innovations?

The innovation methodology can be applied in several practical contexts. In our research, the practical context is corporate-startup collaborations, facilitated through the 20tretti program. 20tretti promotes a powerful arena to boost collaborative innovation projects between well-established, large companies and ambitious startups. During the program, partners enhanced their skills within systems thinking techniques while startups got the opportunity to meet potential future customers or partners. However, considering the program's ability to apply the innovation methodology to foster sustainability-oriented innovations, we need to study outcomes that specifically contribute to new innovations.

Firstly, systems thinking is applied in the problem framing phases of design thinking to broaden innovators' perspectives. The objective is to incorporate aspects that elsewhere might get overlooked. In order to identify these perspectives, innovators need to have a thorough knowledge of the problem and its circumstances, and we believe corporate-startup collaborations utilize this. In 20tretti, the corporates had comprehensive insights into their externalities and climate impacts and were given the task of investigating and defining the problem. The startups linked to the partners benefited from these insights and knowledge about the problem.

However, we have identified some weaknesses regarding the capabilities for corporate-startup collaborations to apply the innovation methodology efficiently. Our findings show that the corporate-startup collaborations do not foster entirely new innovations because of the partners' risk aversion. Partners allocate substantial resources to innovation projects, and the risk of entering collaborations with immature startups in early-development phases is considered too high. Therefore, most of the successful projects in 20tretti consist of startups that have already developed prototypes and MVPs.

On the other hand, corporate-startup collaborations have proven to be effective for boosting the innovation processes of products or services in prototype phases. Our findings show that mature startups with well-developed prototypes are most fitted for the studied practical context. These startups wish to take the next step toward market success and

need to test their solutions in larger systems. The partners have access to attractive markets and enable full-scale testing and validation for such startups. In addition, the partners' willingness to cooperate with these startups is significantly higher than for less developed startups.

To summarize and conclude sub-question three, our research shows that the practical application of the innovation methodology is significantly responsible for the increased expectation for sustainable innovations. In particular, corporate-startup collaborations accelerate innovation processes for startups that are in need of testing their prototypes or MVPs.

7 Concluding remarks

This thesis examines how a combined methodology of systems thinking and design thinking influences the probability for startups to deliver sustainability-oriented innovations to the market. The climate innovation program 20tretti applied the combined methodology in 2021 and has served as a test arena in our research. During our research, we have distinguished between the theory behind the innovation methodology (referred to as the combined methodology or the theory) and its practical application.

The combined methodology seeks to solve the weaknesses of design thinking and systems thinking. To begin with, design thinking is criticized for being too focused on specific user needs and incapable of taking sustainability aspects into account. Our findings show that systems thinking enhances the problem framing phase of design thinking by broadening the innovator's perspectives. Instead of building the problems on market-based customer demands, the problems in our studied innovation methodology are created based on climate challenges identified by 19 Norwegian corporates. Although these corporates state they were familiar with their defined problems, systems thinking techniques made them more confident about the importance of an assumed climate problem. Also, by having formulated climate problems, the threshold of implementing measures to solve them decreases.

Furthermore, applying systems thinking in the problem framing phases ensures that climate aspects, such as carbon emissions, deforestation, and circularity, receive greater attention in an innovation process. After the problem is defined, our innovation methodology implies that design thinking toolkits should be applied in the development of a specific solution, in order to utilize design thinking's effectiveness in developing products.

To sum up, the innovation methodology outlines a great foundation for developing sustainable innovations due to systems thinking's ability to consider sustainability aspects and design thinking's effective process of prototyping products or services. We find that there is a greater probability for startups engaged in 20tretti to successfully deliver sustainability-oriented innovations to the market, than startups not involved in the program. Thus, the research hypothesis is valid. However, we stress that the performance of the innovation methodology is highly dependent on its practical application.

Applying the methodology in the context of corporate-startup collaborations has proven to be an effective platform for fostering sustainable innovations. In particular, we find that innovation development is most significant in partnerships with startups that need to test their products or services in larger volumes.

Disregarding the practical application, the innovation methodology in itself provides valuable contributions to the development of sustainable innovations. Primarily, it establishes the sustainability direction of innovations and ensures that the defined problems are anchored in real-life climate challenges. Although our study finds that the innovation methodology influence the probability for startups to deliver sustainability-oriented innovations to the markets, it is crucial to apply it in a convenient practical context to realize its full potential.

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Appendix

A1 Intervjuguide

Informasjon til respondent:

- Gi en introduksjon av prosjektet vårt.
    - Bakgrunnen for forskningen.
    - Hvorfor vi forsker, og hvilken rolle respondenten har.
- Alle svar blir anonymisert.
    - Startuplab vil ikke få innsikt i hvem som har sagt hva
- Intervjuet blir tatt opp på video og vil bli transkribert i løpet av få dager. Videoen vil bli slettet så fort det er transkribert, og transkripsjonen vil bli slettet når oppgaven er levert og vurdert.
- Varigheten på intervjuet vil være opp mot én time.
- Tar intervjuguiden som utgangspunkt.

Intervjuguide for startups

Del 1: Bakgrunnsinformasjon/oppvarmingsspørsmål

1. Fortell oss om bedriften deres (basisinfo)
2. Fortell oss om din i rolle i bedriften
3. Hva var motivasjonen deres for å bli med på 20tretti?
4. Fortell oss hvordan deres produkt/tjeneste løser klimahodepinen til partneren?
5. Hvilke faktorer anser dere som sentrale for at produktet/tjenesten (innovasjonen som skal løse en partners hodepine) deres når markedet?

Del 2: Bærekraftige innovasjoner

Finne ut om deltagelsen i 20tretti har ført til flere innovasjoner.

Kartlegging av utviklingsfase

1. I hvor stor grad eksisterte produktet/tjenesten deres før deltagelsen i 20tretti?
2. Ble produktet/tjenesten deres tilpasset/endret etter deltakelsen i 20tretti?
3. *Utviklingsfaser: Skriftlig avtale om samarbeid; Konseptuell idé; Teknisk løsning; Prototype; Markedssuksess*
4. Hvilken utviklingsfase er produktet/tjenesten deres i nå?
5. Hvilken utviklingsfase var produktet/tjenesten deres i før 20tretti?
6. Hvilken del av utviklingsfasen har dere størst behov for en partner (partner her menes et stort selskap)?

20tretti sin påvirkning

7. I hvilken grad har dere kommet lenger i utviklingen av produktet/tjenesten på grunn av 20tretti?
8. Hvilken innvirkning vil du si 20tretti har hatt på selve utviklingen av produktet/tjenesten deres?
9. Ser det sannsynlig ut at produktet deres vil bli lansert?
10. Hvis produktet/tjenesten ser ut til å bli lansert, hvor stor del av æren bak dette tilskriver dere 20tretti?

Del 3: Innovasjonsmetodikken

Mål: Finne ut om det er innovasjonsmetodikkens skyld at det har kommet flere eller færre innovasjoner.

1. Bruker dere noen innovasjonsmetoder bruker når dere utvikler produktet/tjenesten deres? Hvilke?
2. I hvilken grad vil dere si at klimahodepinen var presis og enkel å forstå?
3. Ga klimahodepinen dere nye perspektiver på bruksområdet til produktet/tjenesten deres?
4. På hvilken måte da?
5. Passet partnerens klimahodepine det produktet/tjenesten dere utvikler?
6. Var det en god match mellom partnerens klimahodepine og det dere leverer/utvikler?
7. Hvilken rolle spiller klimahodepinen i samarbeidet (utviklingen av innovasjonen) deres i dag? Har den en sentral rolle i dag?
8. I hvor stor grad blir klimahodepinen brukt i utviklingsarbeidet av produktet/tjenesten?
9. Går dere tilbake og kikker på den, eller er den ikke brukt etter finaledagen?
10. Ble det gjort endringer av klimahodepinen etter at dere matchet med partnere?

Del 4: Den praktiske anvendelsen (CSC)

Finne ut om det er den praktiske anvendelsen av innovasjonsmetodikkens skyld at det har kommet flere eller færre innovasjoner.

1. Hva er status på samarbeidet med partner?
    - Hvis feilet, hvorfor?
    - Hvor ofte har dere kontakt med partner?
2. Har dere interesse i å ha tett dialog?
3. Hvilken betydning har partneren for dere? (kunde, utviklingspartner, kompetanse, penger, etc.)
4. Hvordan har samarbeidet deres med partneren påvirket sannsynligheten for at produktet/tjenesten deres blir lansert?

Del 5: Avslutning. Overordnet tilbakemelding om programmet

1. Generelt, hvordan opplevde dere opplegget til 20tretti?
2. Om du skal prøve å oppsummere, hva vil dere si var det beste dere fikk ut av 20tretti?
3. Var det noe med 2t0tretti dere skulle ønske var gjort annerledes? Ev. hva?
4. Er det noe du ønsker å tilføye?

Intervjuguide for partnere

Del 1: Bakgrunnsinformasjon/oppvarmingsspørsmål

1. Fortell oss om rollen din i bedriften
2. Hva var motivasjonen deres for å bli med på 20tretti?
3. Fortell oss hvordan startupens produkt/tjeneste løser klimahodepinen deres?
    - Var det en god match mellom dere og innovasjonen/løsningen på klimahodepinen?
4. På hvilken måte tror dere at dere kan bidra til at startups lykkes?
5. Hva mener dere er det viktigste dere tilfører startups?
6. Hvilke faktorer anser dere som sentrale for at produktet/tjenesten (innovasjonen som skal løse en partners hodepine) til startupen når markedet?

Del 2: Bærekraftige innovasjoner

Finne ut om deltagelsen i 20tretti har ført til flere innovasjoner.

1. I hvor stor grad er dere med på utviklingen av produktet/tjenesten til startupen dere samarbeider med?

Utviklingsfaser: *Skriftlig avtale om samarbeid; Konseptuell idé; Teknisk løsning; Prototype; Markedssuksess*

2. Hvilken utviklingsfase er deres/startupens produkt/tjeneste i nå?
    - Hvorfor er dere der dere er?
    - Hva skal til for å ta steget videre til neste fase?
3. I hvilken grad har dere/startupen kommet lenger i utviklingen av produktet/tjenesten på grunn av 20tretti?
4. Virker det sannsynlig at klimahodepinen deres blir løst gjennom samarbeidet med startupen?
    - Hva trenger dere mer av (tid, penger, kompetanse, timing, vilje)?
5. Er klimahodepinen noe dere hadde jobbet med også om dere ikke hadde deltatt i 20tretti?

Del 3: Innovasjonsmetodikken

Finne ut om det er innovasjonsmetodikkens skyld at det har kommet flere eller færre innovasjoner.

1. Bruker dere systemtenkning når det tas beslutninger i selskapet?
2. Hvordan ser dere på det å bruke systemtenkning inn i innovasjonsarbeidet dere utfører i selskapet?
3. Se for dere at dere at dere skal lage en klimahodepine: På hvilken måte tror dere at den ville bitt annerledes sammenlignet med om dere ikke var med på workshopen?
4. Bidro workshopdagene til at dere fikk et nytt perspektiv på rollen dere spiller i systemet rundt dere?
5. Ble det gjort endringer av klimahodepinen etter at dere matchet med startupen?
    - Hvis ja, hvilke?

Del 4: Den praktiske anvendelsen (CSC)

Finne ut om det er den praktiske anvendelsen av innovasjonsmetodikkens skyld at det har kommet flere eller færre innovasjoner.

1. Hva er status på samarbeidet deres med startupen i dag?
    - Grav
2. Hva tilfører startupen selskapet deres?
3. Hva er det som avgjør om samarbeidet med startupen fortsetter?

- Er det satt noen kriterier fra deres side som er avgjørende for at samarbeidet skal fortsette?

4. Ser det ut til at klimahodepinen deres vil bli løst som et resultat av deltakelsen deres i 20tretti?
    - Hva må til for at startupen skal løse klimahodepinen? (penger, flere ressurser, tid, etc.)
5. Hadde det vært like greit og løst klimahodepinne internt med egne ressurser istedenfor å samarbeide med en startup?
    - Hvis ja, hvorfor?
    - Hvis nei, hva er det dere mangler som startups innehar?

Del 5: Avslutning. Overordnet tilbakemelding om programmet

1. Generelt, hvordan opplevde dere opplegget til 20tretti?
    - Hvordan opplevde dere det praktiske opplegget i 20tretti (*Ideate, Prototype* og *Collab*)?
2. Om du skal prøve å oppsummere, hva vil dere si var det beste dere fikk ut av 20tretti?
3. Var det noe med 20tretti dere skulle ønske var gjort annerledes? Ev. hva?
4. Er det noe du ønsker å tilføye?

A2 Consent form

Vil du delta i forskningsprosjektet

«En kvalitativ studie av hvilken effekt 20tretti-programmet har på bærekraftige innovasjoner»

Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å finne ut av om innovasjonsmetodikkene 20tretti baserer seg på er en god måte å inkorporere bærekraft i innovasjon på. I dette skrivet gir vi deg informasjon om målene for prosjektet og hva deltakelse vil innebære for deg.

Formål
Formålet med prosjektet er å finne ut om innovasjonsmetodikkene 20tretti baserer seg på, system tenking og design tenking, er en god måte å inkorporere bærekraft i innovasjon. Vi ønsker å finne ut om det kommer flere bærekraftige innovasjoner ut av 20tretti programmet satt opp imot om startupene ikke var med på programmet. For å gjøre dette ønsker vi å intervjue både startups og partnere som var med på programmet.

Hypotesen vår er: «Om metodikken som 20tretti-programmet baseres på er god, er det større sannsynlighet for at startups som er en del av 20tretti leverer flere bærekraftige innovasjoner til markedet enn startups som ikke er med i 20tretti».

Dette er en masteroppgave.

Hvem er ansvarlig for forskningsprosjektet?
Norges Handelshøyskole er ansvarlig for prosjektet.

Oppgaven skrives i samarbeid med Startuplab. Startuplab vil derimot ikke få tilgang til dataen dere gir i intervjuet.

Hvorfor får du spørsmål om å delta?
Oppgaven vår dreier seg i stor grad om å finne ut av hvordan startups og partnere som var med på 20tretti, opplevde å være med på 20tretti.

Kontaktopplysningene dine fikk vi tilgang til av Startuplab.

Vi kontakter ca. 8 andre aktuelle intervjuobjekter i tillegg til dere.

Hva innebærer det for deg å delta?
Hvis du velger å delta i prosjektet, innebærer det at du stiller opp til intervju. Vi er fleksible på om det blir digitalt eller fysisk. Vi tenker at det vil ta mellom 30 og 45 minutter å gjennomføre intervjuet. Spørsmålene vil handle om dine erfaringer fra 20tretti-programmet. Vi kommer til å ta notater i løpet av intervjuet. I tillegg ønsker vi å ta lydopptak av intervjuet. Lydopptaket vil bli slettet etter at det er blitt transkribert.

Det er frivillig å delta
Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykket tilbake uten å oppgi noen grunn. Alle dine personopplysninger vil da bli slettet. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger
Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket.

Vi er to studenter som skriver oppgaven, så oss to og veilederen vår vil ha tilgangen til dataen som er samlet inn.

For å sikre at uvedkomne ikke får tilgang til personopplysningene vil navnet og kontaktopplysningene dine erstattes med en kode som lagres på egen navneliste fra øvrige data.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?
Opplysningene anonymiseres når prosjektet avsluttes/oppgaven er godkjent, noe som etter planen er 1. juni 2022. Personopplysninger og data vil bli slettet så fort forskningsprosjektet er avsluttet.

Dine rettigheter
Så lenge du kan identifiseres i datamaterialet, har du rett til:
- innsyn i hvilke personopplysninger som er registrert om deg, og å få utlevert en kopi av opplysningene,
- å få rettet personopplysninger om deg,
- å få slettet personopplysninger om deg, og
- å sende klage til Datatilsynet om behandlingen av dine personopplysninger.

Hva gir oss rett til å behandle personopplysninger om deg?
Vi behandler opplysninger om deg basert på ditt samtykke.

På oppdrag fra Norges Handelshøgskole har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?
Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:
- Norges Handelshøgskole ved Kirsten Foss (veileder). Mail: Kirsten.Foss@nhh.no. Tlf: +47 559 59 572.
- Norges Handelshøgskole ved Bjørnar Vestvik (student). Mail: Bjornar.Vestvik@student.nhh.no. Tlf: +47 980 77 660
- Norges Handelshøgskole ved Endre Fjeldheim Hovelsen (student). Mail: Endre.Hovelsen@student.nhh.no. Tlf: +47 468 92 128
- Vårt personvernombud: personvernombud@nhh.no

Hvis du har spørsmål knyttet til NSD sin vurdering av prosjektet, kan du ta kontakt med:
- NSD – Norsk senter for forskningsdata AS på epost (personverntjenester@nsd.no) eller på telefon: 55 58 21 17.

Med vennlig hilsen

Kirsten Foss (Professor/veileder)	Bjørnar Vestvik (student)	Endre Fjeldheim Hovelsen (student)

Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet «En kvalitativ studie av hvilken effekt 20tretti-programmet har på bærekraftige innovasjoner», og har fått anledning til å stille spørsmål. Jeg samtykker til:

- ☐ å delta på intervju

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet

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(Signert av prosjektdeltaker, dato)