# Cultivating Sportswear Innovation

## A Mixed Approach Combining The Lead User Method and Participatory Design

**Yi-Ning Chuang**

Master's Thesis
Collaborative and Industrial Design Program
School of Arts, Design and Architecture
Department of Design
Aalto University
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# Abstract

**Title of thesis:** Cultivating Sportswear Innovation: A mixed approach combining the lead user method and participatory design
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This thesis aims to study how could the mixed approach combining the lead user method and participatory design cultivate sportswear innovation in local sports culture. The research consists of an exploratory literature review and an empirical case study. Since sportswear has exceeded its primary function purpose toward fashion, culture, and wearable technology, customers' needs have become more diverse and heterogeneous. Even though designers in major sportswear firms have involved users during the product development process, most of the involved users are sports hobbyists who work in the firms. Besides, both centralization of the organizational design process and lack of cross-department collaboration in sportswear firms are the additional barriers to translate the actual customers' needs into the desired products.

To explore a new perspective to solve the described problems, the thesis will review user-driven innovation and participatory design, which both have a reputation in "democratizing innovation" (Bjögvinsson et al., 2010). The lead user method in user-driven innovation theory and the conceptualization of design "Things" (Ehn, 2008) in participatory design studies are underlined. The literature review concludes by demonstrating the complementary characteristics of the lead user method and participatory design. Based on that, a framework that combines the two areas for sportswear innovation is proposed.

The empirical case study examines the mixed approach in practice based on one experimental project, "The future of flying Finns," which consists of two collaborative workshops. In both of the collaborative workshops, identified lead users and industry experts together co-identify innovation opportunities and generate solution ideas from the exploration of the Finnish trail running culture. The research collects the data from two focus group interviews, observation, and self-reflection. Two within-case analyses conducted to examine the collected data provide the insights into the research, which leads to the final cross-case analysis that focuses on investigating the similarities and differences between the two.

The research results are the basis for three guidelines for practicing the mixed approach: planning a collaborative workshop in an innovation project, designing a co-creative toolkit, and mapping innovation context with collective knowledge. First, findings of planning a collaborative workshop are enhancing the effectiveness of participatory design, recognizing the requirement of abstract thinking for lead users, and catalyzing the process with well-prepared workshop materials. Second, findings of designing a co-creative toolkit for collaborative innovation sessions include a clear toolkit structure for communication and vision, inspiring visual aids, and playfulness with a shared interface. Finally, the findings demonstrate the roles and contributions of lead users, industry experts, and facilitator in the innovation context mapping process. In conclusion, this research implies that the mixed approach is capable of co-identifying innovation opportunities and creating new values and meanings to local runners by switching the focus from performance-driven innovation to social innovation. Moreover, it is flexible in team formation through selecting lead users and industry experts with different knowledge backgrounds to explore new innovation opportunities.

**Keywords:** Sportswear innovation, user-driven innovation, lead user method, participatory design



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# Intro-duction 1.0

## Chapter 1

This chapter consists of three sections, namely, research background, research objectives, and the research structure. Section 1.1 describes the research background to give a brief understanding of the motivation and the context of this research. In Section 1.2, the author will present the research objectives and the posed research question. Finally, Section 1.3 shows and explains the research structure as a guide for the audiences to proceed with the research.

## 1.1 Research background

Innovation has been promoted as the key competitive factor for organizations to survive in the market. For inspiring innovation and generating design knowledge, the sportswear industry has been engaging users or customers in the product development process (Watkins and Dunne, 2015; Morris and Ashdown, 2018). Nowadays, most of the product developers in sportswear brands are hired as hobbyists who are active in both the user community and the producer community for constant user involvement (Heiskanen et al., 2010). They have heavily relied on "work colleagues as users" to gather insights and ideas for innovation development (Morris and Ashdown, 2018, p.348).

Even though this process of centralization has the advantage in shortening product development time and protecting of proprietary information, it is likely that the sophisticated customers might feel disconnected to the global sportswear brands and have a higher motivation to purchase sportswear products from the emerging local brands which feel "closer" to them (Berger et al., 2005). Moreover, to the author's knowledge, designers in sportswear firms tend to work in a vertical organizational structure without cross-departmental collaboration during the innovation process. Therefore, considering that the needs of sportswear consumers have become heterogeneous and diverse, global sportswear firms that rely on the centralized design process and lack the close collaborative culture might find themselves facing the risk of losing local customers by not offering the desired innovative products (McCann, 2005).

Over the past decade, researchers have addressed the combinatory concept of user-driven innovation (UDI) and participatory design (PD) to manage innovation (Buur & Matthews, 2008; Bogers et al., 2010; Hyysalo et al., 2014). While UDI focuses on technological





innovation and business opportunities, PD emphasizes the collaborative process and generative tools for context mapping in order to give a comprehensive view on innovation (von Hippel, 2005; Sanders, 2006). With the complementing characteristics of UDI and PD, it seems to be fair to argue that this mixed approach has the potential to tackle the addressed issues in the sportswear industry and to manage sportswear innovation from a new perspective.

Despite the growing attention in this interdisciplinary research area, it is still relatively underexplored. Only a few published studies, to date, have attempted to bring PD into the UDI discussion, and no researcher has studied this specific area in the context of the sportswear industry. The intention of letting users' voices be heard can be found in both fields, and the complementing characteristics for better innovation seem apparent. Moreover, sportswear brands may benefit from this new way of democratizing innovation to decrease the risk of losing local customers. Therefore, the author would like to investigate this niche area where the lead user method and participatory design intertwine to provide a new way of managing sportswear innovation.

## 1.2 Research objectives

In this thesis, the author will explore a new approach in sportswear innovation by combining the lead user method and participatory design, providing the sportswear industry guidelines and insights of involving users or customers and identifiable stakeholders in the decision-making process. The target audiences of this research are primarily designers and design managers who are working in the sportswear industry. This research is organized by the following research question:

***How to cultivate sportswear innovation in sports culture with the lead user method and participatory design?***

To answer this research question, the research will be conducted through an exploratory literature review and an empirical case study on an experimental innovation project. In the literature review, the author will first investigate the recent changes in sportswear and sportswear industry and review the sportswear knowledge creation theory to illustrate and emphasize the sportswear topic as the research context. Then, literature in user-driven innovation, the lead user research method, and participatory design will be reviewed. Finally, the author will conclude the literature review by discussing the complementary characteristics of the lead user method and participatory design, proposing a framework to explain how to combine both areas in order to cultivate sportswear innovation.

One experimental project included two collaborative workshops will be conducted to examine the proposed mixed approach based on a case study research. The intentions are to 1) investigate participants' innovation knowledge creation process, 2) their feedback and reflection on the mixed approach, and 3) gather research data through two post-workshop focus group interviews and observation. Then, the collected data will be analyzed to answer the research question.

## 1.3 Research structure

Figure 1 depicts the five stages of this master's thesis, consisting of the introduction, literature review, empirical case study, findings, and conclusion and discussion. First, the introduction of the research background and objectives are presented in this chapter.





Then, the existing research related to user-driven innovation and participatory design will be investigated in the literature review stage to theoretically frame the mixed approach. In the stage of the empirical case study, two parts of the experimental project, which are workshop planning and running the workshop, will be examined in an empirical case study for data collection and analysis. This leads the thesis to the findings stage, where the author will demonstrate the key findings in three aspects to answer the initial research question. Finally, the thesis will conclude by discussing guidelines and insights of the mixed approach, providing implications for the sportswear industry, and suggesting future research topics.

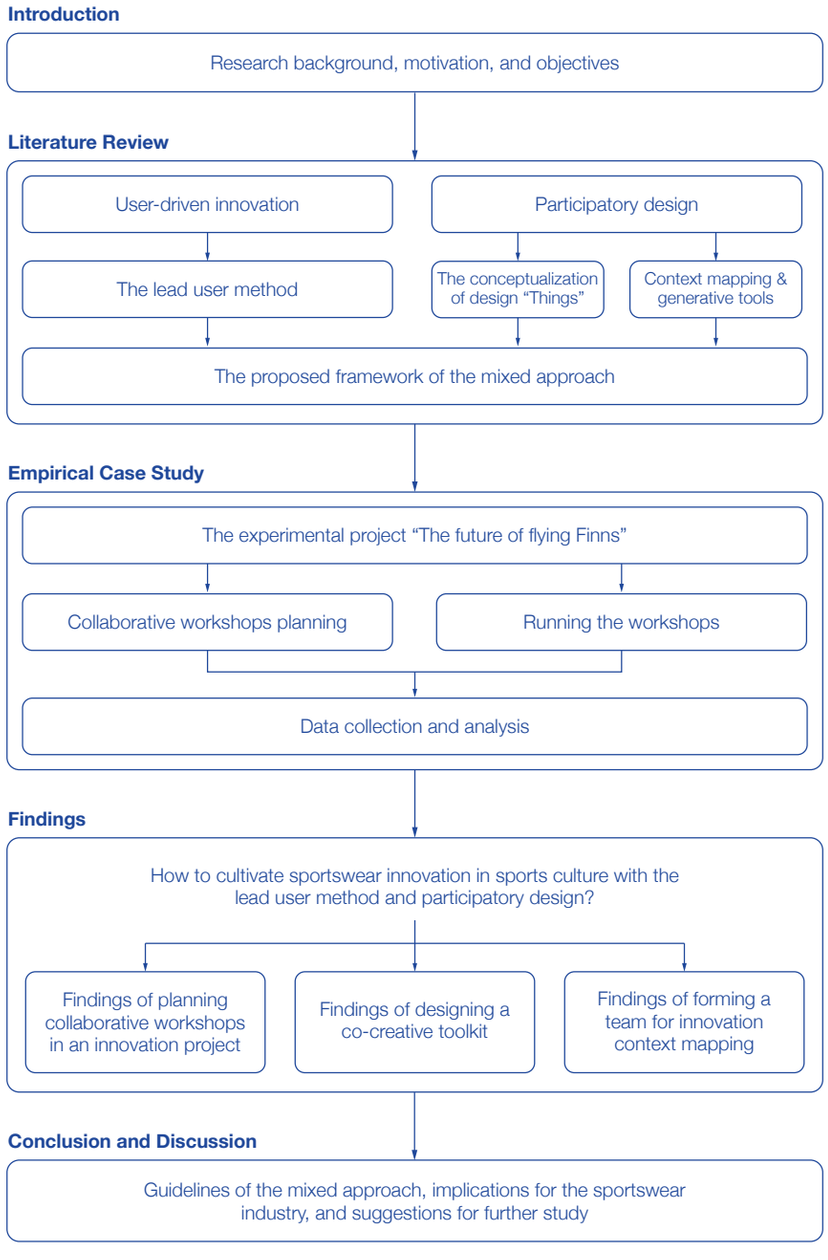



**Figure 1.**
Research structure and the five stages of the research

# Literature Review

# 2.0

## Chapter 2

This chapter demonstrates the exploratory literature review in five sections, namely, from function-driven sportswear to experience, user-driven innovation, participatory design, obstacles of democratizing sportswear innovation, and the summary. Section 2.1 presents the recent changes in sportswear products and the sportswear industry to address the transition toward democratizing innovation. Section 2.2 reviews the literature regarding user-driven innovation, underlining the theory and practical implementation of the lead user research method. Furthermore, Section 2.3 reviews the literature of participatory design, highlighting the conceptualization of the design “Things” and the generative toolkits and methods. After introducing the lead user method and participatory design, which are both related to the concept of democratizing innovation, Section 2.4 addresses the four main obstacles of democratizing innovation in the sportswear industry as counterpart arguments. Finally, Section 2.5 concludes the literature review by summarizing the complementary characteristics of the lead user method and participatory design and proposing a mixed approach with a visual framework that could be applied to the sportswear innovation process.

## 2.1 From function-driven sportswear to experience

Because people are becoming more conscious about wellbeing and sports events have a presence in people's lives through digital media more than ever, the sportswear market has rapidly expanded and is expected to reach a USD 479.63 billion market size by 2025 (Grand View Research, 2019). Under this massive market, user profiles have become more diverse, and so do users' needs have become more heterogeneous.

Although most of the sportswear researchers have referred to sportswear mainly as function-driven or performance sportswear, there is an evolutionary trend of sportswear products becoming more sophisticated in styling and detail and even wearable technology (McCann, 2005; McCann, 2016). In other words, the boundary between performance sportswear and lifestyle sportswear is blurring. Therefore, the author will be using the term sportswear instead of performance sportswear in this thesis to embody the fusion of the two categories.

The idea of democratizing sportswear innovation, which allows user innovation as the external resource to fuel producer innovation in the design process, is still a relatively new topic in the current sportswear industry. However, evidences that not only support but accelerate this democratizing process in the sportswear industry are emerging. There are three identified pieces of evidence. First, the complicated requirements of technologies involved in the product development process are decreasing so that users' design can be produced (Baldwin & von Hippel, 2011). For example, technologies such as 3D printing and computer-aided knitting program enable users to test their ideas before turning it to a usable product. Second, modular design methods and configuration of sportswear products are better understood by the consumers who then become the design-savvy users. Third, the communication





process that enables widely separated users to distribute their designs has become cheap and rapid. Examples can be found in online customization services (e.g., NikeiD) or in-store open hubs (e.g., Adidas Brooklyn Farm and Nike NYC flagship customization store), where the firms provide an open space for local users to co-create customized sportswear products with professional designers (Newcomb, 2018).

### 2.1.1 Sportswear as an emotional design

To design satisfactory user experience to attract local customers, sportswear developers have to shift the focus from "on the designing of sportswear" to "on designing for experiencing and emotion in sports" (Sanders & Stappers, 2008). Since the user experience of sportswear products is based on human-product interaction, customers' feelings about the product attributes should be emphasized more than the product attributes per se (Desmet & Hekkert, 2007). Moreover, emotion is often recognized as "one of the strongest differentiators in user experience" (Khalid & Helander, 2006, p. 204).

Sportswear is a unique product category that has become a modern medium of self-expression due to the wave of empowering advertisement in the 80s and 90s. This phenomenon was driven by "the ideology of athleticism" (Botterill, 2007, p. 123), which was embedded in celebration of personal achievement, self- discipline, teamwork spirit, and personal identity. If major sportswear companies succeed in creating messages their customers deem genuine, profits are rewarded. Therefore, the companies extended their strategy of authenticity to wider areas such as intensive sports, hip-hop communities, nostalgia, and African American communities.

Based on the concept of the the emotional design proposed by Don Norman (2004), three levels of design, namely, visceral design, behavioral design, and

reflective design, can affect users' emotional response to a product, and thus shape their desired product attributes. Among the three levels, reflective design is the most complicated and has multiple dimensions such as message, culture, the meaning of product, or its use. Self-image plays a role in reflective design, and customers will have different interpretations of the same product. Researchers have argued that cultural background is one of the main factors to influence customers' interpretation of a product, and reflective design is cultural-specific and variable (Khalid & Helander, 2006). Besides, consumers with influential purchasing power are increasingly attempting to express their personality through buying "polarizing products:" products that either people strongly like or strongly dislike it" (Rozenkrants et al., 2017, p. 759). Therefore, sportswear brands that provide meaningful products or services for local customers have a higher possibility of generating superior customer satisfaction.

Norman (2004) points out that the iteration process of the human-centered design approach may only work well in behavioral design, whereas visceral design and reflective design are usually driven by one person's vision of the future. Since people in a local group might have higher cultural and value homogeneity than people outside the group, the state by Norman again stresses the importance of designing tailored experience and emotional values for the customers.

### 2.1.2 Knowledge creation in the sportswear development process

To understand the new design knowledge transition between user and producer, Morris and Ashdown (2018) has examined the product development process of performance apparel based on the conceptual framework of the four-dimension knowledge creation theory (figure 2). The researchers indicate that socialization and externalization dimensions are where the design knowledge is produced with both sportswear





developers and users. These two dimensions are also where the three stages of developer-user interaction take place: collecting insights, testing prototypes of preliminary concepts, and testing refined prototypes. On the other hand, combination and internalization are where the design knowledge is produced with design team members and without user intervention, what Morris and Ashdown (2018) describe as designers' "go-away" stage.

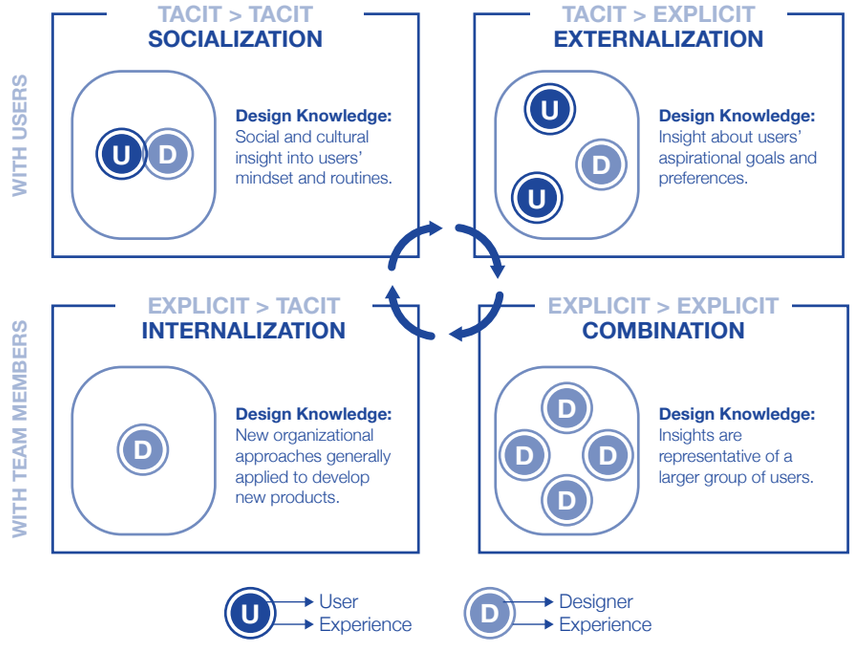



**Figure 2.**
Design knowledge creation in the sportswear design process (Adapted from Morris & Ashdown, 2018, p. 347)

This design knowledge creation model emphasizes the importance of user involvement as a knowledge creation source and also highlights the requirement of designers' intuition when transferring user-generated knowledge to commercialized products. Users' explicit

and observable knowledge can be investigated with the conventional user study methods such as interviews, observation, and focus group (Visser et al., 2005). However, these conventional techniques can only offer users' views of current and past experiences to the research team. In order to learn about users' future experience, Sanders (1992, 2001) suggests to study users' dreams and fears, aspirations and ideas, and proposes the idea in the generative sessions to reveal the tacit knowledge and latent needs of users. Before eliciting users' design knowledge in a co-creation event, Visser et al. (2005) suggest that context mapping is necessary for the recognition of what information researchers would like to investigate.

## 2.2 User-driven innovation

Since users' ability to innovate has been proved in academics and industrial cases, organizations have invested in the research of user-driven innovation (UDI) as an external resource for innovation development. To date, UDI has been acknowledged as an umbrella term in which different levels of user involvement have been developed to meet individual organization's needs (Hyysalo et al., 2016). In general, users are "firms or individual consumers that expect to benefit from using a product or a service;" UDI is innovated by users, rather than by producers, which "expect to benefit from selling a product or a service" (von Hippel, 2005, p.3). For example, accumulated research has shown that users have modified and developed customer products such as extreme sporting equipment to meet their needs (Shah, 2000; Lüthje, 2004; Franke & Shah, 2003).

The process of the traditional producer-centric model focuses on innovating products or services in a closed and internal way, where users are just a group of subjects for producers to investigate in order to





design and develop new products that can fulfill users' needs. Since the fact that users' needs for a product are highly heterogeneous has been proved (Franke et al., 2009), the strategy of "a few sizes fit all" may cause many users dissatisfied with the products they bought from the market (von Hippel, 2005). Furthermore, this user dissatisfaction can lead to serious customer dissatisfaction. It is worth noticing that, when users have a very high heterogeneity of needs, they are more willing to pay for the desired products (Franke & von Hippel, 2003b).

To explain why users are motivated to innovate by themselves, von Hippel (2005) stresses that there are two main reasons, which are the direct benefits from their innovations and enjoyment and learning through the innovation process. Different from producers' profit-driven motivation, users are motivated by self-accomplishment and peers' recognitions of that accomplishment (Riggs & von Hippel, 1994). Specifically, pleasure is one of the main drivers for users in communities to freely share their innovations to others and support and assist others' innovation development, which then forms collective innovation (Franke & Shah, 2003).

Meanwhile, researchers have found that user innovations are often functionally novel innovations, which require "a great deal of user-need information and use-context information for their development" (von Hippel, 2005). For example, innovations of Karakat, a Russian all-terrain vehicle, have been developed and dominated by user innovators because the needs of the use-context such as hobby purposes and local adaptation vary between individual user innovators (Hyysalo and Usenyuk, 2015).

User innovations are often recognized as the new application of instrument that has never been done before (Riggs and von Hippel, 1994). In other words, the design approach of user innovations is always

novel. This is attributed to that producers' information is "stick" to user innovators, meaning that producers possess an abundant of solution information that is difficult for users to acquire (von Hippel, 2005). Therefore, users have no option but to innovate in a radical way in order to meet their needs. In contrast, producer innovations are often incremental, aiming to improve the solution of existed needs by optimizing it to a more convenient and reliable one (von Hippel, 2005). Since user innovations are often radical, many firms attempt to search for user innovations and transfer them to large-scale market diffusion to take advantage of the market competition. Von Hippel (2005) proposes three approaches of user innovation to fill the gap between innovation and innovation diffusion, and the most well-known and widely used approach is the lead user method.

### 2.2.1 The lead user method

The lead user method has been examined and proved in academic research and multiple industries that it can bring massive success to business by identifying lead users and transferring their innovation knowledge to firms' innovation process for large-scale diffusion. (von Hippel, 2005). Researchers have found that the effects of lead-user innovation are distinctive (Morrison et al., 2000; Lüthje, 2004; Franke & Shah, 2003). Innovation managed by the lead user method has the potential to produce an extraordinary sales performance due to its commercial attraction (von Hippel, 2005). For example, lead-user-developed products in 3M were estimated to generate sales eight times higher than the product developed in a conventional way (Lilien et al., 2002). Besides its profitability, this method also has advantages in relatively short development time and low cost, compared to conventional ways of identifying promising new product concepts.

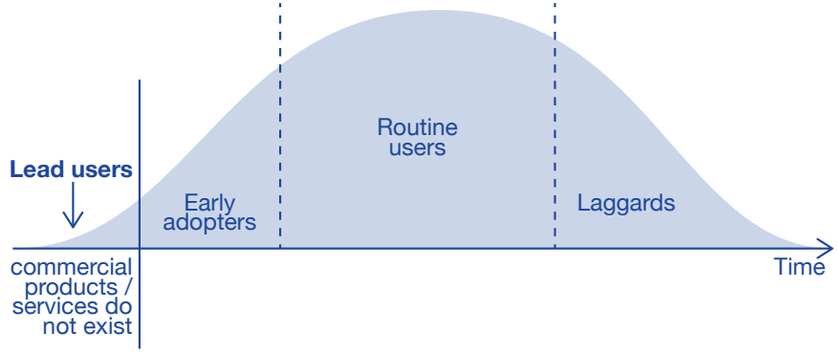
According to von Hippel (2005), lead users have two main characteristics: A) "ahead of the majority of users





in their populations concerning an important market trend," and B) "expected to gain relatively high benefits from a solution to the needs they have encountered there." Although lead users are sometimes confused with early adopters, they are not the same (figure 3). The former offers solutions to the needs that have not been satisfied by the market, whereas the latter is the frontrunner who purchases the latest product or service on the market (Churchill et al., 2009).

**Figure 3.**
Lead users' position in the adaption curve (Adapted from Churchill et al., 2009, p. 7).




Moreover, Churchill et al. (2009, p. 9) propose three following types of lead users that have both of the characteristics and can provide critical information to the lead user project team:

1) Lead users in the target application and market;
2) Lead users of similar applications in advanced "analog" markets;
3) Lead users with respect to important attributes of problems faced by users in the target market.

***Predicting user innovations***

Since lead users are influential in the innovation process, more and more research has extended the

focus from searching among lead users and their created innovations to identifying likely-to-innovate users to predict potential user innovations. One of the primary focus in this research area is to study the local information. Local information, which user innovators almost always utilize, is defined by Luthje et al. (2005) as "the information already in their possession or generated by themselves that can both to determine the need for and to develop the solutions for their innovations." This definition is supported by Thienen et al.'s findings (2012) that a place and situation could shape people's behaviors and feelings, creating new users' needs. Luthje et al. (2005) imply that it is possible for producers to predict potential user innovations by 1) identifying the circumstances where lead users tend to rely on local information to innovate and 2) then studying "the general nature of users' needs" and "available solution information prior to innovation development." This reversed process of user innovation development provides firms opportunities to manage user innovation and prepare for the facilitation of the upcoming innovation diffusion.

### 2.2.2 Conducting a lead user research

To bring lead users to innovate commercially potential product with producers, von Hippel (1986 p. 797) suggests a four-step process for a lead user research:

1) Identify a significant market or technical trend.
2) Identify a sample of lead users who meet both of the lead user criteria: A) They lead the trend in the market, and B) They expect a relatively high benefit from obtaining a solution to their trend-related needs.
3) Bring the sample of lead users together with company stakeholders to generate new solution ideas and concepts in group sessions.
4) Test whether the concepts found valuable by lead users also will be valued by the general users in the target market.





This four-step lead user research process has been further elaborated by other researchers such as Urban and von Hippel (1988) and Churchill, von Hippel, and Sonnack (2009). However, the two-part structure of the process has remained the same: "Trend exploration and identification" and "concretizing solutions" to meet the trends (Hyysalo et al., 2014).

Besides lead users, Churchill et al. (2009, p. 34) point out that "lead use" experts who are the very top authorities concerning their knowledge can also be a crucial source to identify trends and critical customer needs. To be recognizing as lead use experts, they address that two types of knowledge are required: A) significant market and technical trends and B) leading-edge applications of these trends.

## 2.3 Participatory design

Participatory design is originated from the practice of improving workplace democracy in Scandinavian countries, and its design process is usually seen as an ethos that respects people's democratic rights, which require high-level user involvement to be fulfilled (Ehn, 2017). End users in the participatory design process are often seen as experts of his/her experiences who have the "sticky" design knowledge that designers and researchers cannot easily access to (von Hippel, 2005; Sanders & Stappers, 2008). Therefore, in the participatory design process, users play the role of co-designers, and designers and researchers become facilitators to identify and connect the stakeholders in the co-creation process by using their leadership skills (Lee et al., 2018). More importantly, the practitioners' mindset has to shift from designing "for" users to designing "with" users (Sanders, 2002).

To date, participatory design has existed in different appearances based on the expertise and attitude of its practitioners' (Sander & Stappers, 2008). This means that participatory design in sportswear design may have different practices compared to other design fields due to the conditions of the sportswear industry, such as high demand for creativity in the product development process and sensitivity to proprietary organizational information (Morris & Ashdown, 2018). Besides, the properties of sportswear (material) and service (immaterial) are fundamentally different. Since the studies of participatory design are mostly developed from the service design fields, the way of practicing participatory design in the sportswear development process will require reinterpretation and clarification.

### 2.3.1 From design projects to design Things

Traditionally, participatory design has successfully contributed and improved democracy at work. Nevertheless, today's innovation has become heterogeneous and open, and users and stakeholders across organizational borders have become more involved in the innovation development process. To adapt this change, researchers have suggested reframing the conceptualization of participatory design from design "projects" to design "Things" (Ehn, 2008; Binder et al., 2011). Ehn (2008) elaborates "Thing" as: "It reveals a journey from meaning an 'assembly' around 'matters of concern,' taking place at a certain time and at a certain place, to a meaning of 'an entity of matter' or a material' object.'" This new framing builds a bridge between participatory design and social innovation, meaning to collect and assemble socio-materials, which includes human and non-human ingredients, to create social innovation (Manzini & Rizzo, 2011). In the research of Malmö Living Labs, social innovation is multifaceted. It can be not only products or services but also extend to a principle, an idea, a social movement, an intervention, or a mixed of them (Bjögvinsson et al., 2012). Different from technology-driven innovation,





social innovation is able to fulfill social needs and build social relations at the same time. Rogers (2003) also points out that innovation diffusion is a kind of social change where new ideas and practices are innovated as alternatives and then are accepted or rejected by people. This explanation shares similarities with Ehn's suggestion that innovation included technological innovation can create social good, and participatory design has a direct relationship and influences to it. However, design Things are more ambiguous and open than design projects which often have a precise project framing, objective, or product category. Rather than focusing on user involvement in the design process, design Things focus on "seeing every use situation as a potential design situation" (Bjögvinsson et al., 2012, p. 107).

### 2.3.2 Context mapping

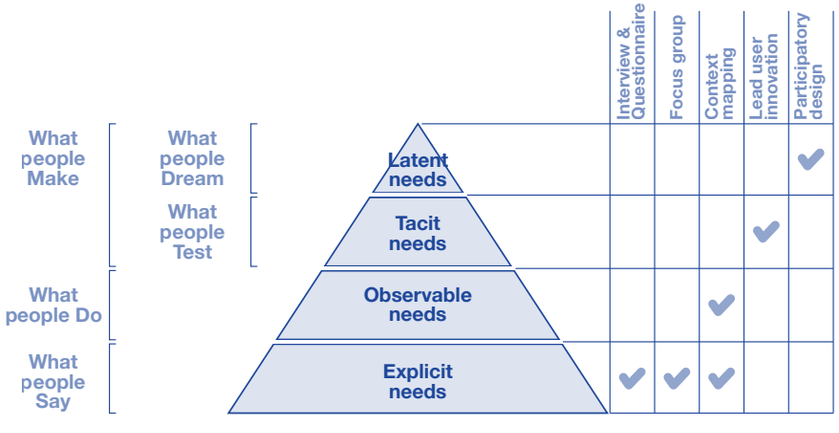
A comprehensive sportswear design process often has got five essential steps, which are research, definition, idea generation, design development, and evaluation, no matter whether it is linear, circulative, or iterative design process (Watkins & Dunne 2015, p. 3). Although participatory design should be applied to all the five stages to embody collective creativity (Sanders & Stappers, 2008), the most critical stages are research, definition, and idea generation. Emphasizing engaging users and stakeholders with generative tools in those three stages is also a distinctive characteristic of participatory design comparing to other user involvement approaches. Therefore, context mapping, a user study that utilizes generative techniques to elicit knowledge from participants and create useful meanings to the design team (Visser et al., 2005), can be utilized to interferer the conventional sportswear design process to provide a comprehensive view on sportswear innovation. Also, context mapping can be extended to help capturing socio-materials of the "Things," forming the foundation for communication and collaboration (Manzini & Rizzo, 2011). Context mapping study often

consists of five stages to lay out the whole context, namely, preparation, sensitization, sessions, analysis, and communication. To clarify the terminology of the "context," the author will be referring Visser et al.'s (2005, p. 3) definition as "all factors that influence the experience of a product use."

### 2.3.3 Participatory design methods and tools

Since different forms of user involvement have their own merits and shortcomings, which vary from case to case, many techniques and methods were developed for participatory activities under different conditions (Hyysalo and Hyysalo, 2018). Figure 4 summarizes different methods that are often used by design researchers for investigation into what people say, do, and make regarding their explicit, observable, tacit, and latent needs (Sanders, 2002). Starting from the bottom of the hierarchic diagram, methods such as interviews, questionnaire, and focus group can help researchers to illustrate the explicit and observable user needs. To document the data in a systematic way, tools such as

**Figure 4.**
User needs and design research methods (Adapted from Sanders, 2002)








empathy map, scenario mapping, and the golden circle map are often used by facilitators.

To extract users' tacit and latent needs, the lead user method and participatory design are needed. After users were proved to have original ideas about alternative designs and innovations, it has all come down to supporting articulation — creating design language between users and producers. Knowing the purpose and context of the tools and customize them accordingly is crucial (Sanders et al., 2010). Therefore, the author will present and discuss some relevant generative tools (the "make tool") related to knowledge elicitation for sportswear innovation development. These visual-aided generative tools are divided into 2-dimension and 3-dimension based on the form of the designed artifact.

**2-Dimension**

***2-D mapping & 2-D collage***

2-D mapping and 2-D collage provide an explicit goal and specific direction for participants to express themselves through a visual and verbal presentation. By practicing, researchers can understand participants' current experiences and further offer guidance in the idea generation session (Sanders et al., 2010). 2-D mapping is relatively restricted in filling the patterned template that is designed by researchers. Examples are user scenario, persona, context map, and customer journey map. 2-D collage, on the other hand, allows participants to express more freely with its loose format. Mood board is one of the examples of 2-D collage.

***Card game***

Card game utilizes the format of card to carry pre-organized visualization such as pictures, signs, and graphics (Sanders et al., 2010). It can be played and shared between stakeholders for ideation on designated topics in a story-telling way (Lucero & Arrasvuori,

2010; Ojasalo et al., 2015). These three 2-D tools can be conducted with either individuals or people in groups in a face-to-face manner.

**3-Dimension**

As discussed in Section 2.1.1, the attribute of self-expression in sportswear design has increasingly valued by customers. Since Ehn (2008) has claimed that participatory design plays an important role in social innovation, the author thinks it would be appropriate to introduce two methods in the fashion activism studies that are often used to empower consumer expression and will for social change: fashion hacking and half-way product (Busch, 2008).

***Fashion hacking***

Fashion hacking is an idea that gives more users access to action spaces to modify the existing consumer items for creating new meanings (Busch, 2008). Fashion hacking borrows the word hacking from the world of computers. The interference of hacking does not have the intention to destroy or manipulate the existing system, but rather explore the hidden properties in hardware and software, empower users and decentralize control (Galloway, 2004; Busch, 2008). This participatory method is also recognized as a practice of re-design. It does not aim to invent something completely new but to preserve the original part and meanwhile break the locked system by repurposing original tools and giving new meaning.

A successful fashion hacking practice was experimented by designer Giana González and documented by Busch (2008). In Giana's workshop, she deconstructed famous fashion brands such as Chanel to various elements and expressions, including specific details, silhouettes, patterns, or material combinations as the "codes." These codes were printed out as pictures, linked by threads, and presented in a map format. Then participants were asked to create new programs by





making reconstructed clothes with their reinterpretation of the decoded elements of the brand. This systematic method of fashion hacking builds a universal language that allows participants to interpret fashion expressions and facilitators to guide.

***Half-way product***

A half-way product is designed to be unfinished by intention. It provides end user an open design space to customize and finalize by their preferences (Fuad-Luke, 2009a, p. 95). This participatory design method is similar to von Hippel's toolkit approach, emphasizing the access to "sticky" information by repartitioning development tasks and the cycle of trial-and-error learning process to correct users' exact needs (von Hippel, 2001). Besides, half-way product is a good participatory design method for sportswear development to conquer the difficulties of prototyping from scratch and to reduce time and cost during the participatory design process. For example, sole of sports shoes requires a mold making and injection manufacture process, which are both very time-consuming and expensive.

## 2.4 Obstacles of democratizing sportswear innovation

Although user-driven innovation (UDI) and participatory design (PD) have been studied for years, there is still a gap between academic research and reality. Therefore, this section outlines the possible obstacles to implementing UDI and PD in the sportswear innovation process based on the study of existing literature. Full analysis can be found in von Hippel (2005), Sanders and Stappers (2008), and Morris and Ashdown's research (2018).

First, according to Morris and Ashdown (2018), the implementation of PD in the sportswear product

development process could be challenging because literal user requests are merely delivered throughout the entire product development process. This is because design knowledge creation often happens in only three separated stages of developer-user interaction, which are collecting insights, testing prototypes of preliminary concepts, and testing refined prototypes. Moreover, sportswear designers see the user as a "construct" consisting of collected user insights, users' feedback from prototype testing sessions, and designers' intuition (Oygür, 2017).

Second, practicing co-creative activities requires the belief that all people are creative (Sanders & Stappers, 2008). In the sportswear industry, where products are highly designer-driven, global sportswear brands such as Nike and Adidas have hired many creative designers to create new product ideas for them. Most of the designers believe that users do not know what they want, and it is their job to offer solution products to users (Morris & Ashdown, 2015). Von Hippel (2005) has also indicated that UDI might not be necessary for industries that have many engineers and model makers waiting to test designers' ideas, such as the automotive and fashion industry. However, innovation today is rather heterogeneous, and sports as the social and cultural activities require not only technological innovation but also social innovation, which can only be innovated across organizational and disciplinary collaborations. Therefore, it is likely that sportswear firms shall value UDI more in order to provide exceptional experiences.

Third, UDI causes a shift in the power relationship between customers and producers. To adapt UDI or other high degree user involvement approaches, it is inevitable that producers must alter their long-held business model and business management. However, this radical change can dramatically affect the "structure of the social division of labor" and potentially jeopardize the ecosystem of an industry (von Hippel,





2005). Therefore, it requires a massive amount of time to adjust the existed system in order to progress incrementally.

Finally, the decision to involve users into a project depends on the scope of the product development. Despite the benefits of reducing uncertainty and decreasing risk and assumptions, not every product development process requires user involvement to achieve its goals. According to Morris and Ashdown (2018, p. 338), product newness, complexity, innovativeness, and price point are the reasons to determine whether a product development process should engage users or not. Among these reasons, product newness is the most important driver of whether the team should involve users.

## 2.5 Summary: The mixed approach combining the lead user method and participatory design

This section summarizes the key insights gathered in the literature review and proposes a mixed approach combining the lead user method and participatory design for sportswear innovation by complementing both the areas.

The studied of user-driven innovation (UDI), especially the lead user method, has been criticized by many researchers on overemphasizing technological innovation and overlooking the connections between people, technology, and context (Buur & Mathews, 2008). In fact, sportswear is not all about function-driven innovation anymore. The space for technological user innovation in the sportswear industry is gradually decreasing because technological innovation for sportswear has become saturated after the longtime

of development. However, user innovators who have high innovation knowledge do exist, and they have local information in bulk, such as cultural and local values, as the innovation capital that is very sticky to major sportswear producers.

To resolve the imperfection of UDI, researchers have been exploring new possibilities by integrating participatory design into UDI research (e.g., Buur & Mathews, 2008; Björgvinsson et al., 2012; Dell'Era & Landoni, 2014). Björgvinsson et al. (2010) state that participatory design methods are the foundation of UDI theory, and participatory design needs to connect with UDI research areas by adopting the business-driven mindset and by defining a new perspective

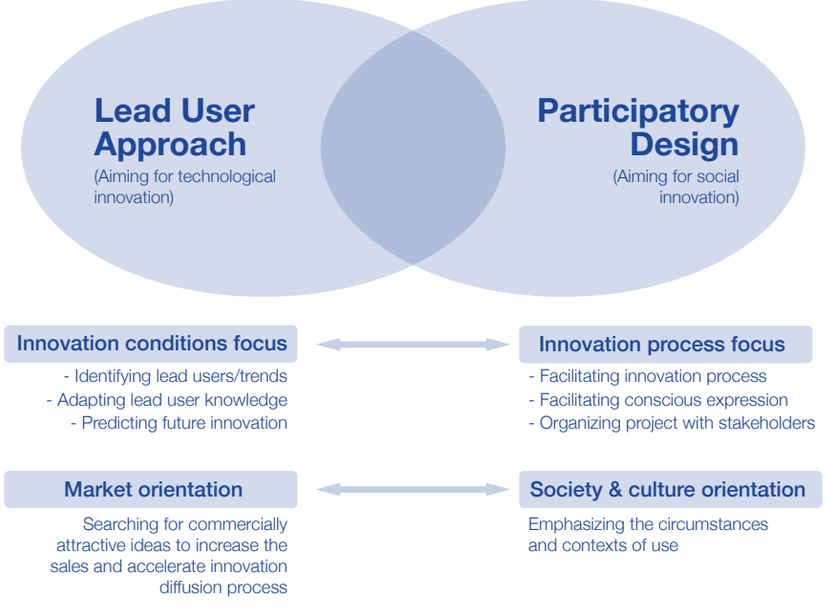



**Figure 5.**
Conceptual framework of the mixed approach of the lead user method and participatory design (Adapted from Buur & Mathews, 2008)





of participatory design. Based on this argument and the concept of participatory innovation proposed by Buur and Mathews (2008), figure 5 is illustrated to elaborate on the mixed approach combining the lead user method and participatory design. The lead user method pays attention to the conditions of innovation (the arrow above). Instead of applying technological user innovation to the producer innovation process, the lead user method could be further utilized to identify end users who have local information in bulk in order to predict future innovations and innovation diffusion processes (see Section 2.2.1). On the other hand, participatory design concentrates on facilitating the innovation process and conscious expression, organizing projects with organizational stakeholders or external parties, and empowering marginalized groups.

As for the purposes (the arrow below), the lead user method is technology-oriented, searching for commercially attractive ideas to increase sales and accelerate innovation diffusion process. Participatory design, on the other side of the spectrum, focuses on conditions and contexts of use, highlighting the interventionist methods and generative tools to involve users and stakeholders for contexts creation actively. These characteristics give participatory design a unique perspective to managing the development process of user-driven innovation.

Based on the proposed framework, the author will argue that this mixed approach is capable of cultivating sportswear innovation in sports culture as the design Things. Researchers can employ collaborative efforts from lead users, organizational stakeholders, and industry experts for "infrastructuring" the sports culture (Ehn, 2008). Furthermore, the identified innovation opportunities can be further developed to commercialized products or services through organizing design projects to bring in different local knowledge, specific competencies, and ideas for innovation solutions (Manzini & Rizzo, 2011).

# Method-ology

# 3.0

## Chapter 3

This chapter consists of three sections, namely, research method, data collection, and data analysis. Section 3.1 describes the overall research method and explains how the research method was selected to answer the research question. Section 3.2 explains the data collection methods and process, including the criteria of interviewees selection and the interview structure. Lastly, Section 3.3 describes the data analysis method and demonstrates the analysis process.

## 3.1 Research method

The goal of this research is to answer the research question: How to cultivate sportswear innovation in sports culture with the lead user method and participatory design? The research methodology is based on the qualitative studies of exploratory literature review in Chapter 2 and an empirical case study, which will be demonstrated in Chapter 4. The literature review provides a conceptual framing of the mixed approach combining the lead user method and participatory design, elaborating the complementary characteristics of the two methods in the innovation process. The empirical case study aims to examine this mixed conceptual approach in practice, exploring its utility and limitations in the context of sportswear innovation. For these reasons, the process and outcomes of the empirical case study will be presented in detail for examination.

## 3.2 Data collection

The qualitative research process comprises the following methods: focus group interview, observation, and self-reflection. Two focus group interviews are the primary approach for empirical data collection, and observation and self-reflection will provide additional insights to support the collected data from the interviews. The primary goal of the focus group interviews was to gain insights and feedback on how the lead user approach and participatory design create impact and make contributions to innovation development. This was done by a set of open-ended interview questions for more in-depth investigation. Interviewees' expression and interaction during the interviews were also considered as a part of data collection. Therefore, both interviews were conducted after the collaborative workshops were completed for the first impression and feedback from interviewees.





Both interviews were separately held and last around 40 minutes.

During both of the collaborative workshops, an observation was done by the author to gain insights on participants' behavior, interaction, and reaction to the given tasks. The primary purpose of observation was to collect insights from the workshop planner's point of view during the workshops and compare it with the insights gathered from the interviewees.

Throughout the whole empirical case study process, self-reflection was used as the method to gain insights on the comparisons between the workshop planning and the actual execution and outcomes. The self-reflection pays attention to the following stages of the project: project initiating and framing, participant recruitment process, workshop framing, workshop content and toolkit design, and workshop facilitation.

### 3.2.1 Criteria of interviewee selection

Since the proposed mixed approach requires both lead users and industry experts to collaborate, two sets of interviewee selection criteria were set for recruiting lead users and industry experts. The two criteria for recruiting lead user interviewees were: A) having experience in long-distance running in Finland for at least five years, and B) having experience in improving his/her running experience with a new idea or any form of creativity (see Section 4.1.1). Both criteria as the indicators are designed to identify the lead users who have possessed abundant local information and potential innovating competence and are culture and fashion savvy to sportswear products. There was no specific restriction of the lead user selection regarding lead users' occupation and demographics. As for the industry expert interviewees, the criterion for recruiting was having at least three-year experience in his/her professional area in or related to the sportswear industry. After the recruitment process was done, the

author realized that two store managers who were considered as industry experts could also be categorized as lead use experts who are doing leading-edge work (Churchill et al., 2009). Table 1 presents the list of interviewees with their backgrounds and experience.

| ROLES: | INTERVIEWEES: | REFERENCED AS: |
|---|---|---|
| Lead User | **Experienced Finnish Trail Runner**<br>• +5 years experience in trail running.<br>• Specialized in barefoot running.<br>• Joined +2 trail running races in Finland per year. | Lead User A |
| | **Experienced Finnish Trail Runner**<br>• +5 years experience in trail running.<br>• Join +2 major trail running races in Finland per year.<br>• Being a running blogger +4 years and running an Instagram account with +1,500 followers. | Lead User B |
| Industry Expert | **Trend Forecast Expert**<br>• Multidisciplinary design background in trend forecasting, concept design, design management, product development and brand building. | Industry Expert A |
| | **Trend Forecast Expert**<br>• 15 years professional experience in fashion industry. | Industry Expert B |
| | **Sportswear Retail Manager**<br>• Worked in sportswear retail business for 5 years.<br>• Was a track and field athlete.<br>• Local hip-pop and R&B musician based in Helsinki. | Industry Expert C |
| | **Sportswear Retail Manager**<br>• Worked at sportswear brand Karhu for 4 years.<br>• Organized local running club and dancing club.<br>• Local DJ based in Helsinki. | Industry Expert D |
| | **Color & Material Designer**<br>• 4 year experience in color & material design and footwear design. | Industry Expert E |

**Table 1.**
Backgrounds of interviewees





### 3.2.2 Interview structure

Since two collaborative workshops were examined in the case study process, two post-workshop interview guides needed to be developed. In order to gain insights that can be compared and synthesized later in the data analysis process, two focus group interviews shared a similar structure. This structure consists of four main subjects that were intentionally designed to enable lead users and industry experts to reflect their thoughts and experience on the workshop process and its connection with participatory design and innovation. Each subject started from a primary open-ended question to inspire group discussion, and then the sub-questions were asked as a follow-up to inquire more detailed information (see appendix 2 and 3).

Interview subjects and structure:

- Workshop planning and content preparation
- The values of the mixed approach
- The values of the co-creative toolkit
- The roles of lead user and industry expert and its connection
- Thank you and wrap-up

### 3.2.3 Documentation

All data collected in both focus group interviews were documented by the following methods and tools:

- Audio recording in both interviews.
- Translating both interviews into transcripts.
  (The author re-produced some of the original quotes and took out the stuffing in the sentences for the sake of reading fluency.)
- Photographing the interview processes.
- Note-taking and drawing by the interviewer.

## 3.3 Data analysis

The data analysis session consists of two separate within-case analyses of Workshop 1 and Workshop 2 and one following cross-case analysis. The data were treated by a qualitative analysis method called affinity diagram. This method can help to visually group the collected data in common for identifying patterns (Hall, 2013). Based on the logic of the affinity diagram method, the collected data from each focus group interview were separated into three groups, including interviewees' quotations and reactions, observation, and self-reflection, and organized in logical sub-groups. Different post-it colors were utilized to represent and emphasize the sources of the data.

Then the data was reorganized into three new clusters, namely, workshop planning, toolkit design, and team formation and roles, as the logical framework for responding to the research question. This action was based on the coding technique, which is a process of labeling the data that holds important meanings and create a new framework by clustering the similar labels in groups. The coding and framework building process was done in both within-case analyses of Workshops 1 and Workshop 2 to providing insights for the study. Finally, the cross-case analysis took place to synthesize both findings in the two within-case analyses, producing a new framework to identify broader meanings for the research findings. The data analysis process was done in a digital whiteboard service called Miro (images 1 and 2).





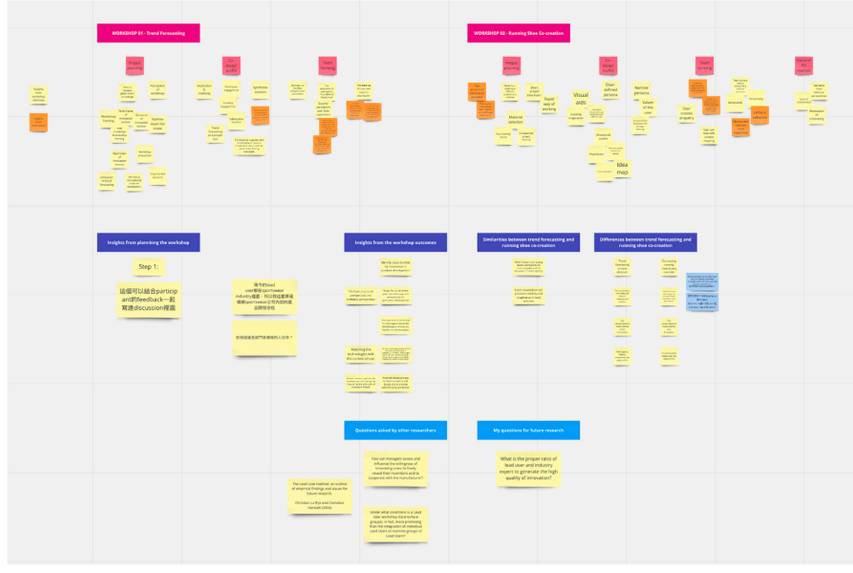



**Image 1.**
Demonstration of the within-case analysis

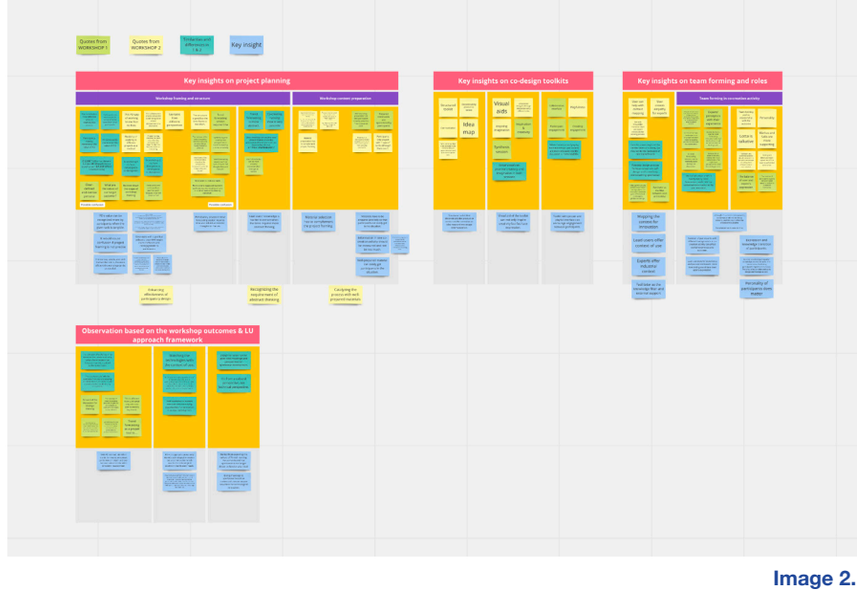



**Image 2.**
Demonstration of the cross-case analysis

# Empirical Case Study:

## The future of flying Finns

# 4.0

## Chapter 4

In this chapter, four sections regarding the project “The future of flying Finns” are presented to demonstrate the empirical case study, namely, project description, workshop planning, running the project, and project reflection. Section 4.1 describes the project objective and the process of the mixed approach to provide the background of the case study. Also, the lead user and industry expert recruitment processes are presented for examination. In Section 4.2, the author explains how both workshops were planned in the following four stages: workshop objective setting, workshop structure design, participants’ roles arrangement, and co-creative toolkit design. Then, Section 4.3 demonstrates the processes of executing two collaborative workshops in practice, outlining the gathered insights, and the innovation opportunities. Finally, Section 4.4 presents the project reflection on the experimental project as the conclusion of this case study.

## 4.1 Project description

***Project objective***

The experimental project, "The future of flying Finns," was framed as the starting point of the design Things of Finnish trail running culture, which provides a concrete, and more importantly, nutritious milieus for identifying innovation opportunities. The objective of this project was to cultivate innovation that can enhance Finnish trail runners' running experience by exploring trail running culture in Finland. Finland has a long history of long-distance running and the unique running conditions in its nature. Finnish runners have possessed strong local information and knowledge of trail running, which is often neglected by the sportswear industry due to the small size of the Finnish market. However, trail running has become a popular sport in the world, and Finnish runners who are relatively familiar with this sport are likely to be the global frontrunners in the trail running culture.

"The flying Finn" was initially a nickname given to Finnish middle and long-distance runners who had won the Olympic games and were famous for their speed. Paavo Nurmi, a Finnish elite runner, is one of the well-known flying Finns. After Finnish runners started to dominate the Olympics, the term had transferred its meaning from a nickname to a cultural feature. Therefore, "The flying Finns" was referenced in the project title to represent and highlight the history behind the Finnish long-distance running culture.

Rather than designing comprehensive innovation concepts directly for the sportswear industry, the primary purpose of this project is "co-realizing" and "co-identifying" opportunities for innovation that can enhance Finnish trail runners' running experience with workshop participants. Therefore, two collaborative workshops were held in this project to achieve the project objective.





***Project approach***

The project approach is based on the two-part structure of the four-step lead user research method that incorporates the conceptualization of design Things to embody the participatory design (table 2). The project approach consisted of three phases: project framing, trend forecasting, and running shoe hacking.

First, it started with project framing. Different from what Churchill et al. (2009) have suggested that project framing should be clearly defined, this project framed for controversies, exploring new ways of thinking and paying attention to the unexpected use. The intention was to map out innovation

| | | | | |
|---|---|---|---|---|
| 4 steps to run a lead user research (Churchill et al., 2009) | 1. Selection of the Project Focus and Scope. | 2. Identification of Trends and Customer Needs | 3. Collection of Needs and Solution Information from Lead Users | 4. Concept Development with Lead Users |
| 2-part structure of a lead user research (Hyysalo et al., 2014) | Trend Exploration and Identification | | Concretizing Solutions | |
| Adapting the concept of Design "Things" (Ehn, 2008) | | | | |
| **Project Approach** | **Exploring "Finnish Running Culture" as the design "Things"**<br>Project objective: Enhancing trail runners' running experience. | **Workshop 1: Trend Identification & Forecasting**<br>Co-identifying and forecasting trends in Finnish trail running culture. | **Workshop 2: Running shoe co-creation**<br>Based on the outcomes of Workshop 1, co-creating a trail running shoe concept to identify innovation opportunities. | |

**Table 2.**
Project approach evolved from the 4-step lead user method and the conceptualization of design Things

opportunities by "infrastructuring" the Finnish trail running culture (Björgvinsson et al., 2010). Second, one trend forecasting workshop was conducted to identify significant trends of Finnish trail running culture and forecast future scenarios. Finally, to develop the forecasted trend further, one running shoe hacking workshop was held to transform the trend to opportunities for sportswear innovation, where lead users and industry experts were invited to co-create a trail running shoe concept based on the results of the first workshop.

### 4.1.1 Recruiting lead users and industry experts

Two lead users and five industry experts were identified and successfully recruited to join the project (table 3). Since the project framing is investigating trail running culture in Finland, the lead user identification started with an online questionnaire (see appendix 3). It was posted in two trail running communities on Facebook in Finland, which have approximately 6,000 members in total. In order to be considered as lead users of Finnish trail running culture, the interviewee candidates had to meet the following two criteria:

- Having over five-year experience in trail running in Finland.
- Have come up with new ideas or new practices to improve his/her trail running experience.

As a result, twenty-eight potential lead users who fit the criteria were identified. Sixteen people in the list have met the second criterion not only through coming up with new running practices but also modifying his/her sportswear products to create a better experience. After collecting the lead user list, the recruitment process started, and invitations were sent to those who showed interest in participation when replying to the online questionnaire. Eventually, two lead users agreed to join the trend forecasting workshop, and one lead user agreed to join the running shoe co-creation workshop.





| Workshop 1 | | Workshop 2 | |
|---|---|---|---|
| **Lead User** | Experienced Trail Runner (Lead User A) | **Lead User** | Experienced Trail Runner (Lead User B) |
| **Industry Expert** | Trend Forecast Expert (Industry Expert A) | **Industry Expert** | Sportswear Retail Manager (Industry Expert D) |
| | Trend Forecast Expert (Industry Expert B) | | |
| | Sportswear Retail Manager (Industry Expert C) | | Color & Material Designer (Industry Expert E) |
| **Facilitator** | The Author | **Facilitator** | The Author |

**Table 3.**
List of lead users and industry experts in both collaborative workshops

As for industry experts, five professionals from four different backgrounds were identified and recruited to the project. Industry experts' recruitment process lasted for four weeks, and the methods were phone calls, emails, and face-to-face invitation. The focus of identifying industry experts was on the specific knowledge of trend forecasting, sportswear retail business, sportswear branding, and sportswear color & material design based on the different requirements in Workshops 1 and 2. For the trend forecasting workshop (Workshop 1), two trend forecasters were recruited to help the lead user working with trends. One store manager who is working in a Finnish sportswear brand was recruited to benefit the team with retailing, branding, and marketing knowledge. For the running shoe co-creation workshop (Workshop 2), one store manager who is working in another Finnish sportswear brand was recruited as the business representation to contribute retailing, branding, and most importantly,

evaluate the business potential of the running shoe concept. Furthermore, one color and material designer with a fashion background was recruited as the design representation.

## 4.2 Workshop planning

Two collaborative workshops were planned and held to cultivate innovation to fulfill the initial brief — enhancing trail runners' running experience in Finland. Thus, the objective of Workshop 1 was to explore innovation opportunities in local trail running culture for sportswear business through trend forecasting; and the objective of Workshop 2 was to take the outcomes of the forecasting scenario and further develop it to a trail running shoe concept. Both workshops were organized by and for the author to study the mixed approach regarding the creative process, co-creative toolkit, and roles of participants for answering the research question.

### 4.2.1 Workshop 1: Trend forecasting

The first workshop aimed to explore innovation opportunities for sportswear business through forecasting the trends in Finnish trail running culture. Even though researchers often recruit lead users to identify trends together in a typical lead user workshop, due to the participatory effort from the industry experts, this trend forecasting workshop could go deeper from trend identification to trend forecasting. Since the workshop included the qualitative research process of identifying trends that could affect the future Finnish trail running culture, it was designed based on the card sorting method. This method was used to make the abstract concept of trends more tangible for participants to understand and organize when proceeding with the co-identifying process (Conrad & Tucker, 2019).





In this workshop, the design session was composed of three parts. The first and second parts focused on trend identification, and the third part focused on trend forecasting. First, participants were asked to group one hundred pre-collected trend signals and find the common nominators. Second, based on the first grouping session, participants were assigned the task of identifying four socio-cultural trends and clarifying other trends that are affected by these four socio-cultural trends. Lastly, participants were asked to pick one socio-cultural trend cluster that was the most interesting and relevant to the sportswear industry and create a future scenario for identifying innovation opportunities in the scenario.

Workshop structure:
- Opening: Welcome and brief introduction
- Design session, Part 1: Grouping
- Design session, Part 2: Analysis
- Coffee break
- Design session, Part 3: Refinement
- Post-workshop interview

***Participants' roles***

To embody participatory design and bring in different perspectives, the team comprised four participants from three different backgrounds, including one experienced runner as the lead user and two trend forecast experts plus one sportswear retail expert as the industry experts. The lead user was expected to enrich the discussion with his local knowledge and vision of Finnish running culture. Two trend experts were invited to help the team to navigate the complexity of the trend forecasting process. One retail expert who is working in a Finnish sportswear retail store was mainly asked to provide sportswear retail and marketing insights and assess the business potential of the future scenario and innovation opportunities.

***Designing co-creative toolkit***

For the trend forecasting workshop, the author designed one card sorting toolkit for participants to co-identify and co-forecast the trends in Finnish trail running culture. The toolkit consists of one hundred trend signal cards, four grid canvases, and one trend forecasting canvas (for card-sorting see Conrad & Tucker, 2019). The one hundred trend signals were collected beforehand in two approaches: the questionnaire replies (41 Finnish runners) and literature related to global and local trail running trends. These trend signals were categorized into six subjects: trail running culture, sustainability, sportswear retail, technology, well-being and wellness, and sportswear fashion, which then were printed on cards with images and text descriptions as the workshop materials. In order to create meaningful interpretations from these trends, two design tools were also provided as parts of this co-creative toolkit.

The grid canvas was designed for participants to build a structural understanding of the trends that are affected by the identified socio-cultural trends (see appendix 4). With this design tool, participants can place the trend signal cards in the sections of Why, Who, How, What, and Where on the canvas for finding the connection between the trend signals. Then, the trend forecasting canvas, which has the three topics — driving forces, on the horizon, and future-proofing, was designed for ideation and visualization during the forecasting process (see appendix 5). Participants were anticipated to envision a future scenario from one of the four clarified trend clusters and future-proof it.

### 4.2.2 Workshop 2: Running shoe hacking

The second workshop aimed to identify innovation opportunities of trail running shoes for the Finnish runners through co-creating one running shoe concept and prototype. This workshop did not aim to design a new pair of running shoes; instead, it focused on





discovering innovative insights that have business potential during the discussion of the co-creation process. In order to collect innovative insights and implicit needs from the participants, the facilitation of participant expression was crucial. Therefore, the workshop was designed based on the fashion hacking method, which was used to deconstruct the configuration of a running shoe into parts so that participants could focus on running shoe repurposing (Busch, 2008).

In this workshop, the design session consisted of three parts. First, participants were asked to clarify the target customer needs with the given user persona (see appendix 6) and the customer journey map of a social running event (see appendix 7). Second, the running shoe hacking toolkit was introduced to participants so that they could co-create a hacking plan of the dream running shoe for the target customer. Lastly, the final part was the prototyping session, where one concept prototype of trail running shoe for social running was created based on the hacking concept.

Workshop structure:

- Opening: Welcome and brief introduction
- Design session, Part 1: Knowing the customer
- Design session, Part 2: Running shoe hacking
- Coffee break
- Design session, Part 3: Prototyping
- Post-workshop interview

***Participants' roles***

The team in Workshop 2 comprised three participants from three backgrounds, including one lead user who is an experienced runner and two industry experts who are the color and material designer and sportswear retail manager. Similar to Workshop 1, each of the participants had a role as a lead user or industry expert to achieve the workshop objective with their background knowledge and expertise. The lead user aimed to enrich the discussion with local knowledge

and vision in social trail running in Finland. Color and material expert was expected to provide insights on sensorial and functional design for the trail running shoe concept, which is vitally important in sportswear innovation. The sportswear retail expert who happened to have the lead use knowledge in organizing a new form of social running club was mainly expected to offering retail and marketing insights and examine the potentials and feasibility of the co-created trail running shoe concept.

***Designing co-creative toolkit***

One hacking toolkit of running shoe was designed by the author for ideation and concept development in this workshop (see appendix 8). This toolkit includes one hacking canvas and a set of cards (for the hacking toolkit and the hacking process see Busch, 2008). The hacking canvas demonstrates nine deconstructed parts of a running shoe as the "folders": silhouette, upper structure, lacing system, midsole cushioning system, cushioning level, outsole traction area, add-on details, extra support, and color scheme.

The initial idea of this hacking toolkit was that, by placing the "codes" in each folder, participants could discuss which decision would make the most sense to create their trail running shoe concept. Therefore, three types of cards were designed for this purpose, which are the code card, the material card, and the functionality card. First, the code cards show the different design features in each part of the running shoe (the folders). For example, different types of lacing systems were on the code cards so that participants can pick one and place it in the folder of lacing system. Second, the material cards have a sample of functional materials that are often used in the running shoe design. The intention was to give participants a simulation when hacking on the canvas. Third, the functionality cards represent the key functionalities that should be emphasized in each folder when designing the trail running shoe concept.





## 4.3 Running the project

**Workshop 1**

To begin the workshop, the author gave a brief introduction of trend and trend forecasting process to participants so that they could have a deeper understanding of trends in general. This short lesson was given after participants had introduced themselves to each other, and the workshop objectives were introduced.

In the first part of the design session, participants were asked to cluster the one hundred given trend signal cards to find common nominators. Starting from the six categories pre-created by the author, participants then found twenty-two common nominators in Finnish running culture within 40 minutes (image 3). Leading by these common nominators, participants then identified three socio-cultural trends and other trends related to it on the three grid canvases. The three identified socio-cultural trends were environmental awareness, personal improvement through self-monitor, and social sharing (image 4). Even though the initial aim was to clarify four clusters of trends, the workload was too heavy to finish in the 50-minute session. Therefore, the team completed three clusters of socio-cultural trends.

In the final part of the design session, participants picked the "social sharing" socio-cultural trend cluster for trend forecasting. The trend title was named as "social runner," in which eight driving forces were identified: social sharing, sense of belonging, peers learning, self-exceeding, self-expressing through communities, compassion & care, positive competitiveness, and runners' identity (image 5). The team marked social sharing and peer learning as the two primary driving forces among the eight. In the section "on the horizon," short-term, mid-term, and long-term scenarios of the trend "social runner" were envisioned and co-ideated by participants. One of the interesting scenarios was the concept of "running

**Image 3.**
Process of identifying common nominators from the pre-collected 100 trend signals

**Image 4.**
Process of clarifying the socio-cultural trend cluster on the grid canvas

**Image 5.**
Process of forecasting the selected trend cluster on the canvas






mob," which the team forecasted that social runners are likely to value the identity of their running clubs more in the following two years. And the sportswear industry should provide products or services that help the runners to express their group identities.

Unfortunately, the future-proofing section was not completed due to the limited time the team had. However, the results and discussion in this trend forecasting workshop were still considered as fruitful and insightful by the industry experts. With the reliable process of the lead user method and participatory efforts, the team had verified that "social runner" is one of the potential trends in Finnish trail running culture. This is because social running activities in nature are diverse in terms of routes, running conditions, and training methods, and runners can experience the adventures together with other like-minded runners in the accessible Finnish nature.

Moreover, the trend forecasting outcomes opened up the opportunities for collaborative innovation for the sportswear industry. All the supporting trends of "social runner" and the team's vision in the future scenarios seemed to point in one direction: How can we inspire local trail running communities to be more expressive, and create a positive peer-learning environment for them? Participants had come to the agreement that this question offers the sportswear industry a new perspective of seeing the trail running culture, apart from sportswear products, and addresses the needs of cross-industry collaboration to search for solution ideas and innovations.

**Workshop 2**

Following the "social runner" trend, the objective of the second workshop was identifying sportswear innovation opportunities through co-designing a trail running shoe concept for Finnish social runners from a perspective of "social running event experience." Similar to Workshop 1, a brief introduction was given

after participants had introduced themselves.

The design session began with part one — knowing the customer, where one customer persona and one customer journey map were given to participants to identify and clarify target customer's needs during the journey of the social running event (image 6). During this 30-minute phase, five primary insights were identified:

- Finnish social runners do not want to compromise aesthetics for functionality even though they are running in relatively harsh conditions in nature.
- Finnish social runners would like to look good on the race photo for sharing it on the social media.
- Seeking for an adventure and new experience is the primary motivation of attending a trail running event.
- In trail running, terrain defines which shoe you should pick, and every race has different terrains.
- Online influencers are impactful to trail runners when purchasing sportswear products and seeking advice for race preparation.

With these five insights, participants then proceeded to part two: the hacking session. The running shoe hacking toolkit was presented. With the facilitation, participants began their collaborative process by filling the hacking canvas with the ideal code cards to design a dream trail running shoe for the target customer profile (image 7). Meanwhile, the author was paying attention to participants' discussion, trying to interpret what the lead user said during the decision-making process for identifying her latent needs and implicit design knowledge. Thirteen more insights about Finnish social trail runners' needs were identified by the author.

In the third part, participants were asked to make one physical running shoe prototype with the prepared materials and tools for testing their design concept (image 8). They started the prototyping process from





picking the proper shoe sole for their concept, and built the upper by combining the reflective material and engineered mesh for a new sensorial experience. One of the insights discovered in the hacking session was that a clean and minimalist upper structure with proper stability could prevent rocks or sticks from being stuck on the shoe. To stress this identified insight, participants placed a foam material between the two layers to keep the surface of the shoe upper clean.

As mentioned before, instead of creating a comprehensive trail running shoe concept, the purpose of this workshop was to identify opportunities for trail running shoe innovation that has business potential. Therefore, the outcomes of opportunities for innovation are synthesized and demonstrated in table 4. These opportunities offer a clear direction for searching partners for collaboration. For example, innovation opportunity 1 explains how sportswear companies can collaborate with the material engineering industry to develop a single material innovation that has a strong upper structure to meet customers' sustainable and functional needs.

**Image 6.**
Process of identifying the target customer profile and needs on the persona and customer journey map

**Image 7.**
Running shoe hacking session

**Image 8.**
The concept prototype of a trail running shoe designed for social runners in Finland





| Insights | Innovation Opportunities |
|---|---|
| 1. The upper surface should be as clean and minimalist as possible, because upper that has multi-layered structure might cause runner uncomfortable when wood or rock stuck on the upper.<br>2. Due to the sustainability concerns from the target customer who enjoys running in nature, all the support areas on trail running shoe should avoid TPU or any kind of plastic material. The enhancement of support areas should be done in one or few materials if possible. | 1. Support areas on shoes such as heel counter and toe cap should be designed with the upper as a whole. This can be developed in material engineering and material structural design to create the structure that uses only one sustainable material. |
| 3. Although many trail running shoes are designed to be more colorful in recent years, using bright colors on trail running shoe might cause psychological concern to social runner because it does not look good when it gets muddy. | 2. The selection of colors on trail running shoe should maintain colorful but with a darker shade. |
| 4. Trail running shoe should be more playful and less technical. | 3. Combining playful and functional material in one innovation. For example, Mesh and reflective material combination provides a subtle and playful reflective effect. |
| 5. Comfortable topline design is crucial to long-distance trail runners because it can prevent rocks going into the shoe.<br>6. Low-cut silhouette is more popular in long-distance trail running because it has better mobility and aesthetics. | 4. Designing a low-cut topline that is comfortable to wear and meanwhile tight enough to adhere to the ankle and prevent rocks going in. |

**Table 4.**
Identified insights and innovation opportunities collected from Workshop 2

## 4.4 Project reflection

This experimental innovation project with two collaborative workshops succeeded in cultivating innovation in Finnish trail running culture by identifying opportunities for innovation development and potential collaboration. In Workshop 1, the team produced 22 common nominators from the one hundred trend signals in the trail running culture, three in-depth clusters of trends, and one trend forecasting result with driving forces and future scenarios. In Workshop 2, the team identified five insights of customer needs in Finnish social trail running, 13 insights for trail running shoe product development, and four opportunities for innovation development and collaboration.

The mixed approach combining the lead user method and participatory design had accomplished the project objective with its complementary advantages. The lead user method brought in lead user knowledge and the two-part project structure to identify relevant trends and solution ideas that are leading in the market. On the other hand, participatory design brought in industry knowledge, co-creative toolkits, collaboration techniques, and knowledge of context mapping. Overall, participants seemed to enjoy and felt satisfied in both of the workshops.

In Workshop 1, the original time frame was three hours, but in the end, the team not only exceeded the time frame but decided to skip some of the steps. The author noticed that the short time frame with heavy workload could create stress for the facilitator and participants, and this could have a negative influence on the workshop outcome. For example, participants were supposed to narrow down the trend forecasting outcome by highlighting more Finnish local trends rather than general trends. Due to the stress, the author was not able to fully facilitate participants during this convergent process. Moreover, the outcome of the future scenarios was described by the retail expert only as "having a huge potential on the marketing side at the





moment." However, four participants had reached a consensus on that the future scenarios did highlight the opportunities and values for companies who want to stay relevant in the trend of "social runner."

The initial idea of bringing industry experts to trend forecasting workshop was to extend the trend identification of the lead user method to trend forecasting with the help of the participatory efforts. However, only one lead user was successfully recruited to Workshop 1 to provide insights and local knowledge. It is difficult to justify that the workshop outcomes could represent the whole Finnish trail running culture, especially when there were influences from three industry experts at the same time.

The author found that the recruitment process was the most challenging phase in this experimental project. Only two of the twenty-eight potential lead users and five of the twenty-two potential industry experts were successfully recruited. The recruitment process had proceeded for over one month, which was indeed time-consuming. The most common reason of rejection was the conflict of schedule. Therefore, the ideal recruitment process should be started at least two months beforehand, because the co-creative toolkit and workshop content preparation can only be precisely prepared after the list of the workshop participants was confirmed.

# Findings

# 5.0

## Chapter 5

In this chapter, the author presents the research findings based on the case study in three sections, namely, planning collaborative workshops in an innovation project, designing a co-creative toolkit, and forming a team for innovation context mapping. These three sections provide insights into three different stages of the mixed approach implementation. First, Section 5.1 looks at the findings of how to maximize the potential of the mixed approach during the phase of workshop planning. Second, Section 5.2 shows the findings of what should be considered when designing a co-creative toolkit so that the toolkit can help to extract innovation knowledge from both lead users and industry experts. Finally, Section 5.3 shows the findings of team forming and the roles of lead users, industry experts, and the facilitator in the innovation context mapping process.

## 5.1 Planning collaborative workshops in an innovation project

This section will focus on three groups of research findings of how to maximize the mixed approach combining lead user method and participatory design when planning a workshop. First, Section 5.1.1 showcases the findings of the ways of enhancing the effectiveness of participatory design. Second, Section 5.1.2 focuses on the finding about lead user knowledge extraction and its connection with the level of abstract thinking of the given tasks. Finally, Section 5.1.3 presents the findings of the considerations of preparing 2D and 3D workshop materials in order to catalyze the collaborative process.

### 5.1.1 Ways of enhancing the effectiveness of participatory design

In this section, the author discusses three ways in which the effectiveness of participatory design can be maximized when participants are dealing with intangible tasks, namely, a longer time frame, a loose structure, and visual expressions. The author will discuss how these considerations apply to both intangible and tangible tasks that are given in a collaborative workshop.

The first finding was that, when the given task is tangible, the participatory effort is significant and effective, whereas an intangible task might decrease the participatory effectiveness. According to interviewees, the participatory approach had indeed provided them a more holistic perspective to proceed with the given tasks in the running shoe hacking workshop. Industry Experts D described that: "I feel this participatory design process let me reduce my bias and work with others from the same starting point" (Industry Experts D). This participatory effort was not recognized by only one participant, as Industry Expert E further said: "As a designer, it is really effective to talk with people who have different types of experience on the product" (Industry Experts E).





However, research data indicated that the effectiveness of participatory design was recognized less by the participants in the trend forecasting workshop. This finding is attributed to that intangible tasks require more individual processing, research, and visual expressions, which distract from the focus on collaboration. In order to enhance the effectiveness of participatory design, a longer time frame is needed for individual processing. Industry Expert A described that: "I think the workshop structure was good, but we could have gone deeper if we had had more time for things to mature in the way of mind. Then that would also require a bit more discussion and research" (Industry Experts A). Industry Expert B continued by saying: "Normally, in the trend research process, you edit a lot. Of course, we have a minimal amount of time, so we did not quite have time to edit or crop it" (Industry Experts B). Both of the experts claimed that 3-hour time frame was not enough in Workshop 1 for participants to process their thoughts and bring their insights to the discussion.

Besides, participatory design does not necessarily mean to co-create or co-identify together during the whole process. A proper amount of individual work, which allows each participant to absorb and digest the intangible task, could also enhance the effectiveness of participatory design. In other words, participants needed more time, but this does not have to mean more collaborative time. This insight could be validated by Hyysalo and his research colleagues' research (2014) in which a lead user workshop was held to envision the future of maker space. The lead users were asked to write down the future trends "individually" on pre-filled cards without the interference.

The second finding was that a loose workshop structure could also benefit the participatory process when dealing with intangible tasks, opening more space for synthesis and trend editing, and avoiding rushing in the convergent phase. During the transition of narrowing down the one hundred trend signals on the three grid

canvases (see Section 4.3), confusion started to emerge among participants: "I think we tried to force ourselves to make all the stuff into one sentence for summing up everything. At this point, you do not need to edit yourself or try to be too precise" (Industry Experts A). Industry Experts B further said: "I think the trends that we picked were interesting, but we lost a little bit of the inspiration we had formed in part 1 to translate it to part 2. That was when I sensed a little bit of confusion. I was looking for synthesizing and making it a bit more abstract at the upper level. But then you (the author as facilitator) took the discussion and focus to more sportswear industry-specific" (Industry Experts B).

The third finding was that the need for more visual expressions is beneficial as Industry Experts A described: "When we were figuring out the Why, Who, and How on the grid canvases, the more visual materials you have, the better. We can then cut down or add images so that we could elaborate on those trend descriptions with visual materials. That always helps me to convey my in-depth and emotional thoughts" (Industry Experts A). This explains that intangible tasks such as trend research would sometimes be difficult to express in words, and visual expressions such as collage would help to communicate one's thoughts and emotions. Besides, new visual materials are needed in the synthesis phase: "These pictures on the trend signal cards are great, but they do not serve as visual materials when synthesizing and creating a new kind of perspective" (Industry Experts B). However, visual expressions might not be familiar to every participant. Trend forecast expert also pointed out that "It is not easy to come up with visuals to depict trends. However, for me, as a design researcher with a visual background, I always work with reference pictures and mood boards" (Industry Experts A).

Through observation in Workshop 1, most of the participatory effort came from two trend forecasting experts. The lead user and retail expert were acting as





supportive roles to contribute to the team with trend identification and validation, and to provide scattered insights into the forecasting process. This situation might be attributed to the workshop process that was modified based on the professional trend forecasting process, which could be unfamiliar to those who have no experience in trend forecasting. Moreover, trend experts who were more familiar with the process would take over or sometimes dominate the conversation. This mismatch of familiarity of the process could also decrease the effectiveness of participatory design in a collaborative innovation session.

Different from this section, which sheds light on participatory design, Section 5.1.2 will focus on lead user's contribution to ideas for innovation opportunities and solutions, which is related to the level of abstract thinking.

### 5.1.2 Connection between lead user knowledge extraction and the level of abstract thinking of the tasks

This section focuses on the connection between lead user knowledge extraction and the level of abstract thinking of the given tasks. The finding was that lead users' knowledge regarding innovation solutions is harder to extract when the workshop tasks require a higher level of abstract thinking. This finding was discovered through the cross-cases analysis between Workshop 1 and Workshop 2.

Since the workshop framing of Workshop 1 was relatively ambiguous (see Section 4.2), the workshop tasks, such as trend analysis and synthesis, required a high level of abstract thinking. As a result, the lead user had difficulty to find an entry point to offer his knowledge of Finnish trail running culture. When Lead User A was asked to elaborate the example of how he contributes his user knowledge to the team, he answered: "I do not remember. I just went with the

flow. But I think I got to talk about my experiences of trail running. And, honestly, the trend forecasting process was a learning curve for me" (Lead User A). This research data indicated that the lead user could provide his user knowledge, but the impact of his contribution to the outcome might not be strong enough for him to recall.

Compared to Workshop 1, the workshop frame of Workshop 2 (trail running shoe co-creation) was more narrow, which required less abstract thinking for the lead user. As a result, the lead user did provide more valuable insights.

### 5.1.3 Considerations for preparing workshop materials

This section demonstrates three elements of the well-prepared workshop materials, which can catalyze and inspire the collaborative innovation process. One of the elements is related to the two-dimensional (2D) material preparation, and two of them are for the three-dimensional (3D) material preparation.

The research finding showed that 2D workshop materials that offer precise information are able to act as a catalysis for the collaboration process. The research data indicated that these materials are capable of engaging participants, as participants would already have the visible objects to start processing the tasks, especially at the beginning of the workshop. Industry Expert C described that: "I liked the physical materials (trend signal cards) that we have got to work with. It was really clear and easy to jump into, because it was well planned out already" (Industry Expert C). The majority of participants also expressed the same appreciation to the effort of 2D material preparation (e.g., the cards, the customer journey map, and the canvases). However, the research data also indicated that, if 2D materials are not precisely defined so that each stakeholder can fully absorb the information on it,





it might do the opposite and cause confusion. Industry Expert E pointed out that: "I think it is especially important to narrow down the user persona and the values that the target user has in his/her life because I think that all designs are strategical and value-driven. So it is easier for us to understand the customer value in persona" (Industry Expert E). This lack of precise information had caused the team extra 10-minute time to detach from the original schedule to fill up the missing information on the persona, which was inefficient and discouraged to participants.

As for 3D material preparation, the first finding was that it could be inspiring if it is prepared with a purpose of complementing the workshop framing. When the author was planning Workshop 2, the decisions made for the material selection were based on material attractiveness and playfulness because the author had anticipated that these types of materials could inspired social running discussion and further catalyze the collaboration process. Moreover, if the materials preparation did not aim to complement the workshop framing, it might be completely useless, as Lead User B described that: "If we talked quite a bit about what kind of cushioning could be the solution for our concept, it would be irrelevant because we do not have different types of trail running shoe with different outsoles and foams for us to play with" (Lead User B). Lead User B continued: "The materials that we actually have could drive the process quite a bit. If you want to take all the different elements into account, but you have just a limited pool of materials, then those are going to direct the prototype outcome" (Lead User B).

The second finding of 3D material preparation was that having a symbolic meaning in each selected material is crucial because it allow one material to represent several materials. Since it is impossible to collect all kinds of 3D materials in one workshop, material selection should be resource-based, and more importantly, materials should have a symbolic meaning in order to trigger

interesting discussions. A good example of symbolic material representation is sustainability. There could have been one sustainable material sample to represent sustainability in Workshop 2, as Industry Expert E said: "Material preparation is more like resource-based. However, I think that it could be beneficial to have some sustainable materials when we were choosing the foam-based material. Then we could ask ourselves, should we consider providing sustainable material such as cork to meet customers' needs" (Industry Expert E). This finding indicates that workshop planners should consider and, if possible, define a symbolic meaning in each material when preparing the material selection for co-creative workshops.

## 5.2 Designing a co-creative toolkit

This section will focus on three groups of research findings on how to design a useful co-creative toolkit for a collaborative innovation project. First, Section 5.2.1 looks at the findings of the benefits of creating a structural co-creative toolkit. Second, Section 5.2.2 shows the findings of the merits of incorporating visual aids in a co-creative toolkit. In order to fully employ the benefits described above, it is crucial to consider accessibility when designing a toolkit. Therefore, the final Section 5.2.3 demonstrates the findings of the approaches of engaging participants to collaborate through the design of the co-creative toolkit.

### 5.2.1 Benefits of creating a structural toolkit

In this section, the author showcases three findings of the benefits of creating a structural co-creative toolkit in a collaborative workshop: establishing efficient communication, providing clear vision, and expandability.





The first finding was that a toolkit with a clear structural could help lead users and industry experts communicate and transfer knowledge more efficient when collaborating. It often happens that the knowledge of sportswear product development between lead users and industry experts was not at the same level. In Workshop 2, Lead User B, who has little knowledge of building a sportswear product, said that the running shoe hacking toolkit provides explicit focuses, because the running shoe was demonstrated in a structural and deconstructed way. Therefore, she could express her user knowledge more efficiently. She described that: "Because the hacking toolkit is organized in a structural way, you can actually focus on the things that you need to focus step by step. I do not think we would have done all the insightful discussions if we had not proceeded from separating the running shoe. I did not know that running shoe has so many details" (Lead User B).

As for industry experts, this structural hacking toolkit gave an overall picture of the focused product and ensured that each consideration was covered in the discussion: "I really like that the running shoe is deconstructed to many parts so that we can actually consider everything" (Industry Expert E). Industry Expert E also suggested the team to discuss the "upper structure" and "extra support" folders together, so it makes more sense from the perspective of design. This research data indicated that, through the structural toolkit, both lead user and industry experts can be on the same page when collaborating and have a clear direction in their minds when proceeding with the assigned tasks. Therefore, structural toolkit can be seen as a platform for exchanging innovation knowledge.

The second finding was that a structural toolkit could also help participants systematically document their thoughts and proceed with a clear vision. The hacking toolkit was seen as an idea map for Industry Expert D: "For me; the hacking toolkit works as an idea map

for us to document our thoughts and ideas, which also allows us to trace back if we need it" (Industry Expert D). During the prototyping phase in Workshop 2, the author had observed that participants had gone back to the hacking canvas many times to evaluate their prototype work based on their previously created hacking plan. Industry Expert E described that: "When we were creating the prototypes, we actually went back to the hacking plan and checked what the things that we were thinking about. And what are we missing now? So we could turn it into the prototypes. It is very handy" (Industry Expert E).

The third finding was that a structural toolkit has expandability, meaning one can add or delete the "code" in any of the folders or create a new folder based on the workshop framing. This utility allows the co-creative toolkit to be reused in different workshops, creating a space for new ideas and knowledge to be discussed. The functionality of expandable toolkit is originated from the idea of fashion hacking (Busch, 2008). Therefore, this method can be applied to sportswear products or services that can be deconstructed. Although the hacking toolkit is expandable and can be seen as a database for design elements of running shoes, one must pay attention that revealing too many folders or codes in a workshop might cause confusion to participants.

### 5.2.2 Merits of utilizing visual aids in a co-creative toolkit

In this section, the author demonstrates three findings of the merits of utilizing visual aids in a co-creative toolkit. The first finding was that visual aids could provoke participants' creativity and imagination. All the interviewees expressed that the visual aids in both the trend forecasting toolkit and the hacking toolkit had inspired them to be more creative when tackling the assigned tasks. Industry Expert D described that: "I think those visual aids are needed. It is almost like





you have to have them" (Industry Expert D). Inspiring visual aids are necessary in the innovation process, especially in the co-ideation session, in which creativity affects the final outcomes. The second finding was that visual aids could also help participants articulate their thoughts: "When you see those visual aids, it opens up your mind better than if you are just thinking it. It helps you evolve your imagination and put it in words in a way" (Industry Expert D). It is perhaps that the first and the second findings are not surprising and have been anticipated when the author was planning the co-creative workshop. However, the third finding regarding visual aids was unexpected.

Since participants were asked to follow the design process with the pre-designed toolkit, they were in a designated frame that was set and led by the workshop planner. In other words, the toolkit might limit participants' imagination when proceeding with the tasks because of the given guidelines. However, the third finding was that visual aids could be properly selected in a way that it can induce participants to break through the invisible frame and think outside the box. One example that appeared in Workshop 2 can further explain this finding. Although the design subject was trail running shoe, the author intentionally selected few lifestyle shoe images on the cards. Unexpectedly, Lead User B noticed the difference between the feature of the lifestyle shoe and the trail running shoe. She then asked a question about the image: "Why does this shoe have a TPU plastic attached on the shoe upper? That might not be a good idea because the upper could be stuck with little rocks or sticks". This question led the team to identify one key insight in a short time: the layer structure on the upper of trail running shoes should be designed as few as possible to prevent natural objects such as stones and sticks from being stuck on the shoes.

### 5.2.3 Approaches of engaging participants through toolkit design

In this section, the author elaborates on two approaches of engaging participants through the design of a co-creative toolkit, which are playfulness and shared interface. The first finding was that the playfulness of a co-creative toolkit could engage participants through encouraging them to move around the physical cards and experimenting ideas with a hands-on approach. Lead User B described that "I think the hacking toolkit is really good. You can just play with the cards and think about: What about this? What about that? I like that kind of feeling because it is playful. I have not used this kind of model (hacking toolkit) before, but I have used a similar model in a marketing communications workshop. You actually focus on the things that you need to focus" (Lead User B). Lead User B not only pointed out the factors of the playfulness but also identified the same playful experience from other workshop. This finding aligns with Schulz et al.'s (2015) finding that playful modeling with simple-to-use toolkits can contribute to the innovation process, creativity, and idea generation. Although playfulness is immensely crucial, there is another factor that can determine the utility of the co-creative toolkit, which is the shared interface.

The second finding was that playful toolkit should complement with a well-designed and shared interface to encourage lead users and industry experts to collaborate. In other words, interface and physical environment where the toolkit playing session takes place should provide equal access for all the participants. This equality would require the consideration of the number of participants, the visibility of the image and text, and the mobility of the toolkit materials. Based on observation, the author noticed that participants were not able to see others' action of sorting the one hundred trend signal cards in Workshop 1, because the cards were horizontally placed on the round table surface. Therefore, participants could only focus on





their individual grouping work most of the time, which had no benefit to collective knowledge creation.

## 5.3 Forming a team for innovation context mapping

This section focuses on two groups of research findings of how to form a team that can benefit the innovation context mapping process in collaborative workshops. First, Section 5.3.1 shows the findings of participants' roles in the innovation context mapping process, including lead user, industry expert, and facilitator. Second, after revealing the three roles of participants, Section 5.3.2 shows the findings of the two considerations of team forming, which are the proportion of participants with different backgrounds and the personalities of participants.

### 5.3.1 Participants' roles in the innovation context mapping process

In this section, the author discusses three different roles of lead user, industry expert, and facilitator in the innovation context mapping process. Research data indicated that each of the three roles has its own contributions. First, lead users can build empathy for the team and provide the context of use. Second, industry experts can provide industrial contexts and ways of working. Last but not least, facilitator acts as the filter between the innovation context creation and the workshop objective and also as a mediator between lead users and industry experts when the opinions conflict.

***Lead user: Building empathy and context of use***

The data indicated that lead users could help the team create empathy and context of use based on the

given target customer persona, as Industry Expert D described: "I feel Lead User B's experiences helped us a lot, and also her personal stories. I have never thought that way because I only look at it from a retail perspective. It is hard even to imagine trying to think from another way by myself" (Industry Expert D). This feedback from Industry Expert D represents that user knowledge comes from lead user's personal experience and stories, and this information can be transferred to industry experts through empathy. Industry Expert E also expressed the same feeling: "It is so interesting that you (Lead User B) talked about how the shoe will eventually get dirty after the run, and you want to keep it clean because it is a social event. I often do the design process just by going around and making shoes as pretty as possible from the perspective of color and material design. This is indeed a new point of view for me as a designer" (Industry Expert E).

Moreover, Lead User B is very aware of the context of use as she said that, "I think many trail running shoes, maybe it's Nike, they always have this wonderful single track scene in somewhere of California in their commercials. But the trail there is definitely different from the trail that we have in Finland" (Lead User B).

***Industry expert: Building industrial context of sportswear and way of working***

As for industry experts, in the case study, industrial knowledge, including sports shoe design and production, color and material design, and sports shoe retail and branding, were brought to the collaborative process to complement user knowledge. These industrial contexts were not only beneficial to lead users but also to other industry experts. Industry Expert D said that Industry Expert E's expertise and knowledge in design had provided him a new perspective to see the running shoes: "When ideating, your way of looking at sustainability and megatrends are open-minded to





me. It allowed me to think of sustainable consumer behavior" (Industry Expert D). Industry Expert D, as the retail expert, had also given insights into customer preference and branding to help the team to shape the context of innovation.

In addition to transferring industrial knowledge, industry experts can also enrich the innovation context by their ways of working. In Workshop 1, Industry Expert B was reminding other participants to elaborate on their thinking process when clustering the trend signal cards. She intended to encourage others to speak up so that everyone could learn from others' perspectives. This way of working might come from her experience in professional trend forecasting session. Also, in the first part of Workshop 2, where participants were asked to identify target customer's needs, Industry Expert E drove the team with her way of conducting customer research. She suggested that the target customer's values had to be defined with more details regarding megatrends and personality so that the design outcome can fully fulfill customers' desired needs.

***Facilitator's role in context mapping***

Facilitator plays a crucial role as a filter between the innovation context creation and workshop objectives. This finding came from a failure in Workshop 1, where the author focused too much on the workshop process facilitation but neglected the importance of narrowing down the global trends to local trends. Industry Expert A pointed it out and said: "Maybe if you (facilitator) have really insisted that we need to get results on the Finnish market, and guided us more in that direction. Also, reminded us not to go too far. The workshop outcome would have been closer to the objective" (Industry Expert A). This filter is especially needed during the converging stage, such as the transition period from part 2 to part 3 in Workshop 1 to steer participants to the anticipated direction.

Also, a facilitator should mediate the conflict when participants have different legitimated arguments on one debate. In Workshop 2, there were two different opinions regarding clarifying the target customer profile. Industry Expert E shed light on how target customer's personality and values on persona can be more precisely defined from the design perspective. Whereas Lead User B argued that, ideally, trail runners would like to have one shoe that fits all the situations, so it might not be a good idea to narrow down our customer persona. Based on the observation on Industry Expert E and Lead User B's reaction, instead of immediately solving the conflict, emphasizing the importance of open discussion and managing the time for it might be the better facilitation.

### 5.3.2 Considerations of managing team formation

In this section, the author focuses on two considerations of managing team formation, which are the proportion of participants with different backgrounds, and participants' personalities.

The data indicated that the two trend forecasting experts in Workshop 1 were the driving force of the knowledge creation process. Even though this might be attributed to the advantage of trend experts being familiar to the trend forecasting work, it is possible that having two trend forecasting experts in a four-person team would also be a critical factor. Industry Expert E also verified this finding in Workshop 2. Since each participant has their expertise, Industry Expert E said that "It depends so much on what type of person and what background they have and how many of them are in the workshop. I believe it would affect the end result" (Industry Expert E).

Besides, depending on the task given, participants with a different background and competence might become the driving force of the knowledge creation process





in each section of the workshop. Although Lead User B had dominated the conversation in the first two sections of Workshop 2, Industry Expert E, who has a fashion design background, became the leading role in the prototyping section. And the Lead User B switched to a supporting role to give the team feedback based on her user knowledge. At the same time, Industry Expert D, who has retail and marketing backgrounds, was less engaged and said: "From our action, we can tell who has experience in shoe prototyping" (Industry Expert D). This reaction was attributed to that Industry Expert B was unfamiliar to the prototyping task, which then decreased his engagement in the knowledge creation process.

The second finding was that the personality of a participant could also directly influence the workshop outcome, as Lead User B said: "I think different kinds of personality will also affect the end result. If you have a different type of trail runner sitting here, you would have something completely different" (Lead User B). Indeed, from the perspective of participant's personality, Lead User B in Workshop 2 was more talkative than Lead User A in Workshop 1. Although there was no direct proof that participants who expressed more would contribute more to the innovation knowledge creation, the opportunity of gathering relevant insights for innovation knowledge creation did increase. This research data revealed that even if the workshop planner has considered the proportion of the representatives from different backgrounds, innovation/design knowledge creation in a co-ideation or co-creation activity still cannot be fully managed.

# Conclusion & Discussion

# 6.0

## Chapter 6

In this chapter, the author concludes and discusses the research findings in five sections, namely, guidelines for cultivating sportswear innovation, innovation opportunities born from the Finnish trail running culture, implications for the sportswear industry, limitations, and further research. First, Section 6.1 summarizes the research findings, focusing on how to cultivate sportswear innovation through the mixed approach combining lead user method and participatory design. Second, Section 6.2 discusses the innovation opportunities that were identified from the design “Things” of the Finnish trail running culture, highlighting the differences between technological innovation and social innovation. Third, Section 6.3 provides the implications of the research work to the sportswear industry. Fourth, Section 6.4 outlines the limitations of this research. Finally, Section 6.5 concludes this thesis by suggesting topics and directions for further research.

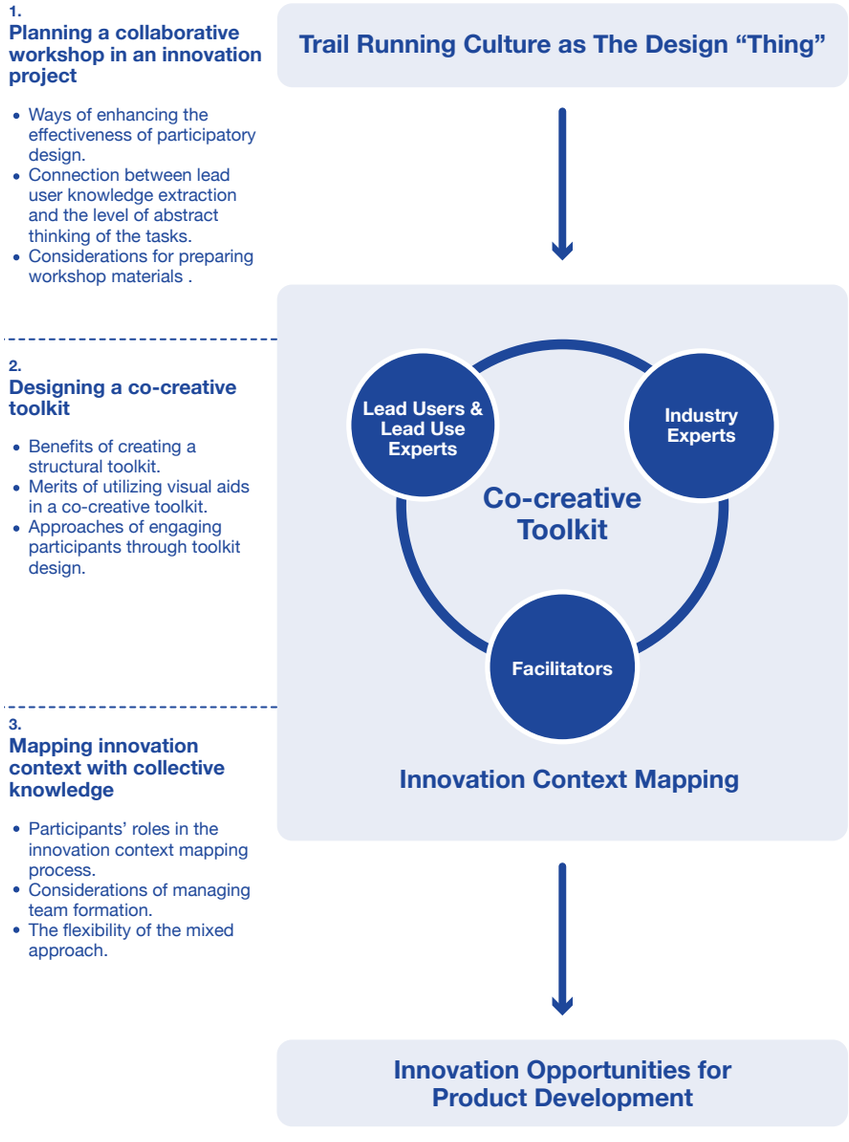



**Figure 6.**
Summary of the research findings with visualization





## 6.1 Guidelines for cultivating sportswear innovation

Based on the research findings, this section provides three guidelines for cultivating sportswear innovation in sports culture, namely, planning a collaborative workshop in an innovation project, designing a co-creative toolkit, and mapping innovation context with collective knowledge (figure 6). These three topics are presented as the three pillars of implementing the mixed approach combining the lead user method and participatory design.

### 6.1.1 Planning a collaborative workshop in an innovation project

This study has examined that the mixed approach combining lead user method and participatory design is capable of identifying innovation opportunities and producing solution ideas through exploring the trail running culture in Finland. Therefore, this section presents three key findings that can ensure and amplify the performance of this mixed approach.

#### *Ways of enhancing the effectiveness of participatory design*

The study shows that when the given task in a collaborative workshop is tangible, participatory effectiveness is significant and can be recognized by both lead users and industry experts. However, when the given task is intangible such as trend forecasting, the effectiveness of participatory design decreases because intangible tasks often require more individual processing, research, and visual expressions, which could distract the focus on collaboration. In order to increase participatory efforts, the findings suggest that a longer project time frame and a loose workshop structure can allow individual thoughts to mature and to be elaborated in the collaborative process. Moreover, visual expressions should be facilitated so

that participants can communicate their emotions. The findings also imply that the workshop planner should avoid designing a collaborative workshop based on the professional working process in any domain. This might cause the situation that conversation is dominated by industry experts who are more familiar with the working process, and thus decrease the participatory efforts from lead users or other industry experts.

***Connection between lead user knowledge extraction and the level of abstract thinking of the tasks***

One of the primary merits of lead user method is its capability of extracting and transferring local user knowledge to the firm's innovation development process. However, the research finding shows that lead users' local knowledge is harder to extract and transfer when the given task in the co-creation workshop requires a high level of abstract thinking. Therefore, the workshop planner would need to consider this perspective when planning not only the workshop content but also the structure.

***Considerations for preparing workshop materials***

According to lead user and industry expert interviewees, well-prepared workshop materials in forms of 2D and 3D can be the catalysis in the collaboration process. 2D materials, such as cards, persona, customer journey map, or any canvas, can engage participants as they already have the visible objects in their hands to process the tasks. However, if 2D materials are not precisely defined so that each participant can fully absorb the information, it might do the opposite and cause confusion. As for 3D materials for sportswear prototyping, it should be prepared in a way that it can complement the workshop framing and objective. Moreover, the findings suggest that 3D material preparation should be resource-based and, more importantly, have a symbolic meaning in each material so that one material can represent several materials and





thus inspire discussions. For example, a sustainable material prepared for the workshop might trigger the discussions of sustainable consumer behavior.

### 6.1.2 Designing a co-creative toolkit

According to existing research, an appropriate toolkit for co-creation can not only enable users to innovate with true design freedom and to complete cycles of trial-and-error learning but also different stakeholders to collaborate with the same language and the same focus (von Hippel, 2001; Sanders and Stappers, 2008). Therefore, this section presents three research findings of the considerations for designing a co-creation toolkit for collaborative workshops in an innovation project.

***Benefits of creating a structural toolkit***

The study shows that having a co-creative toolkit with a clear structure has three benefits. First, structural toolkit enables lead users and industry experts to communicate and transfer knowledge more efficient when collaborating, balancing the knowledge level between lead users and industry experts. For lead users, it raises the awareness of the product/service development process in a production case; for industry experts, it gives an overall picture of the focused product/service and ensures that everything is covered in the discussion. Additionally, the majority of the interviewees said that a structural toolkit could be seen as a platform for exchanging design knowledge between lead users and industry experts. Second, structural toolkit enables participants to document their thoughts systematically and proceed with a clear vision. According to interviewees, a structural toolkit serves as an idea map which guides participants toward a clear direction and meanwhile allows them to trace back to the initial starting point. Last but not least, a structural toolkit is expandable, meaning that one can add or delete the "code" of design element in each structural section ("folder") or even change the folder based on

the workshop framing and objective. The functionality of expandable toolkit is originated from the idea of fashion hacking which aims to reassemble the design elements with an intended purpose. Therefore, this method can be applied to any sportswear product or service that can be deconstructed.

***Merits of utilizing visual aids in a co-creative toolkit***

According to interviewees, utilizing visual aids such as images to support text descriptions in a toolkit has three merits. First, visual aids can inspire participants to be more creative when co-identifying and co-creating. This finding of utilizing visual stimulation to foster creativity is not novel and can also be found in other research collecting either subjective or objective data (Wang et al., 2010). Therefore, it can be agreed that having visual aids in a toolkit is beneficial for co-creative activities. Second, visual aids are capable of helping participants to express and articulate their thoughts when they have the images in mind. Although both findings described above were anticipated, one unexpected finding was found through observation: visual aids can induce participants to break through the frame of the given toolkit and tasks and to think outside the box. In Workshop 2, the author arranged some lifestyle shoe images which are less relevant to trail running shoe, and this provoked the lead user to identify one key insight from a "non-trail-running-shoe" perspective. This finding indicates that the workshop planner can intentionally arrange a decent number of contradictory visual aids in the toolkit for unexpected insights.

***Approaches of engaging participants through toolkit design***

Many interviewees addressed that the playfulness of the toolkit had been beneficial to them to be more deeply engaged in the co-creative session. Through playing around the physical materials like cards, participants





can do the hand-on experiment and test their idea in a short time and shared it with others. Meanwhile, others can give their feedback in the same way. However, this has to base on the well-considered interface that is shared and equally accessible. In other words, factors such as the number of participants, visibility of the image and text, and mobility of the materials have to be considered. Otherwise, some participants might be disconnected throughout the participatory process.

### 6.1.3 Mapping innovation context with collective knowledge

The research findings show that through the collaborative efforts of lead user/lead use expert, industry expert, and facilitator, context for new innovation development can be mapped, and each role has a different approach to contribute to the context mapping process.

***Lead users***

Based on the research data, lead users who are in the leading role in their domain are capable of providing the context of use of a product, service, or even practices. According to von Hippel (2005), this innovation knowledge has business values that could be employed and commercialized by the producers. At the same time, lead users also build empathy for the team by telling personal stories and experience, enabling industry experts to think from the user's point of view.

***Industry experts***

According to research data, two main contributions can be made by industry experts, which are providing industrial contexts and knowledge and benefiting the team with their ways of working. Industry expert can be any professional who has an expertise that is relevant and required in the project development process. One co-creative activity could and should have multiple

industry experts from different backgrounds to enrich the innovation context. In addition to offering industry contexts such as mass production knowledge, advanced technology application, and retail management, these industry experts can also bring in their ways of working when proceeding with the given tasks, stressing the critical steps which they know could affect and determine the final result.

***Facilitator***

Emphasizing by the interviewees, facilitators play a crucial role as the filter between innovation context creation and workshop objectives. Even though the process in a co-creative workshop might be messy and uncertain, facilitators should always be aware of the workshop objective and the direction that the team is heading to. It is critical to remind participants and, if necessary, interferer and guide the discussion when the context mapping process is irrelevant to the objective. Besides, facilitators would have to be able to mediate the conflict between different perspectives or arguments. Based on the findings, two suggestions are given to facilitators who encounter a conflict situation. First, facilitators can stress that conflicts are inevitable and important for an open discussion. Second, when a facilitator is mediating an open debate, he/she should manage the time of the session.

## 6.2 Innovation opportunities born from the Finnish trail running culture

This section demonstrates and discusses two additional findings of cultivating innovation in sports culture with the mixed approach combining the lead user method and participatory design. Section 6.2.1 showcases the innovation that is cultivated in the Finnish trail running culture can shift the focus from technological





innovation to social innovation. Section 6.2.2 discusses the flexibility of this mixed approach in terms of team formation and participant selection.

### 6.2.1 The shift from technological innovation to social innovation

Based on the outcomes of both collaborative workshops, the mixed approach is capable of building an infrastructure for innovations based on exploring the Finnish trail running culture. Moreover, the identified innovation opportunities show more possibilities in enhancing trail running experience than focusing only on performance-driven innovation. The findings imply that innovation cultivated from a sport culture could help to shift the focus from technological innovation to social innovation. Workshop outcomes such as the concept of "running mob" which identifies that local running communities might need a strong expression of group identity (one of the outcomes in Workshop 1) and seeing trail running as one type of social event that requires a fashionable outfit in the muddy condition (insights from Workshop 2) were identified as the solution ideas with innovation opportunities. These outcomes align with the claim that social innovations, as diverse as products, services, or even a principle, an idea, a social movement, or an intervention, are capable of creating new social relations (Bjögvinsson et al., 2012). Based on the data of the empirical case study, these social innovations are able to give new meaning to trail running shoes or to trail running per se and further bring new values and tailored experience to the trail runners. Moreover, these social innovations, as the starting point, can be carried on in the form of collaborative workshops or new projects to further develop it to an actual commercial product or service that is likely to have a business potential.

Besides, these social innovation opportunities had clearly pointed out which industry or company can become a potential collaborative partner. According

to Industry Expert B, the future scenario of the trend "social runner" demonstrated opportunities for industries that want to stay relevant to the trend, and sportswear firms can manage this research result for an open innovation project.

However, identifying social innovation opportunities requires an ambiguous project framing in which participatory design can help navigating the uncertainty. Since the design "Things" has been promoted, this new interpretation of participatory design has exceeded the function of providing generative tools and workshop facilitation and turned into a guideline for stressing on local matters and cultivating social innovations.

### 6.2.2 The flexibility of the mixed approach

Even though this experimental project selected running shoes as the product category in Workshop 2, the mixed approach and the framework of the lead user, industry expert, and facilitator formation can be applied in collaborative workshops with different objectives to cultivate different types of innovation. According to Industry Experts D and E, the management team can try out different combinations of team formation by selecting lead users and industry experts with different knowledge backgrounds to explore innovation opportunities. For example, if the formation of industry experts in Workshop 2 was composed of a knitting expert, color and material expert, and material engineer expert, the workshop outcome will most likely be completely different.

Furthermore, this mixed approach framework provides an agile way of innovating compared to the innovation process in major sportswear firms. First, the time of lead user research process has already been proved that it is shorter than the producer innovation process. Second, based on the research data, this mixed approach had covered and involved lead users and industry experts throughout the four dimensions





of sportswear knowledge creation (socialization, externalization, combination, and internalization). In contrast, current sportswear developers only involve users in socialization and externalization dimensions in the product development process (Morris & Ashdown, 2018). In other words, bringing experts from organizational departments or external parties together during the innovation knowledge creation process can increase the efficiency of cross-department communication with lead users on the scene and accelerate the knowledge creation cycle.

## 6.3 Implications for the sportswear industry

In this section, the author provides two implications for the sportswear industry based on the research findings of this thesis. The empirical case study and interviewees have verified the literature review reframing, examining the utility of the mixed approach regarding identifying innovation opportunities and providing solution ideas for local needs in cross-disciplinary collaboration.

First, the sportswear industry should consider local sports communities and local sport enthusiasts as external innovation resources. Moreover, the industry should encourage internal and external collaborative innovation that is developed by a cross-disciplinary team. This mixed approach has been evaluated to be flexible to team formation by selecting different lead users and industry experts in the innovation process. It has the advantage of bringing different perspectives together in the early stage of the innovation process to explore and identify innovation opportunities that an individual domain cannot accomplish.

Second, cultivating innovations from a local sports culture as a nutritious milieu extends the possibility

of developing technological innovations to social innovations. Even though this concept of exploring sports culture for innovations is relatively new, this research study suggests that innovations that aim to create better experiences for sport as a social practice can provide equal or even more values to customers than functional-driven innovations.

## 6.4 Limitations

In this section, the author discusses three limitations in this research study that should be addressed. First, the topic of this study was researched because of the author's passion for sports and sportswear and the knowledge of user-driven innovation, participatory design, and sportswear design, which the author has focused on during the master's study. Initially, the aim was to seek industry collaboration for the benefits of research resources and career opportunities. However, this attempt failed, and the author decided to carry on the proposed topic of cultivating sportswear innovation. Therefore, the author not only initiated the project but also deeply involved in it. Since the case study was based on the experimental project, the author's high level of involvement could be considered as lacking objectivity from an academic point of view.

The second limitation is a consequence of the first one, being that the experimental project for the case study research did not take place in the context of a real-life industrial project. In other words, there was no sportswear organization as a partner in this project. This shortage led to the fact that business-driven objectives and key factors for decision-making were lacking for the author to navigate the project process. Although lead user innovations have been proven to be highly beneficial to business value, no legitimated assessment in this research was done to evaluate the





business potential of the workshop outcomes that were produced by the mixed approach. The author realized this dilemma and, therefore, decided to stress more on the innovation process and strategic work of the mixed approach. Despite the endeavors of practicing the mixed approach was limited, it is fair to say that the workshop outcomes indeed pointed out to the specific opportunity areas for innovation development, which were considered promising by the industry experts.

Finally, workshop participants were not selected from a single sportswear firm and its in-house teams. Since the problem of lacking cross-department collaboration in major sportswear firms was addressed in the initial problem statement, it would have been more appropriate to recruit employees who are working in in-house teams as the industry experts to test the hypothesis that the mixed approach could benefit the collaborative innovation process.

## 6.5 Further research

To the best of the author's knowledge, accumulated research regarding sportswear design and innovation is focused primarily on functionality and human mobility. Since sports have been recognized more as a social activity and sportswear design has become a trendy topic, only a few published papers showed true endeavors exploring new possibilities of sportswear innovation from an experience-centric or local-centric point of view. Research in this thesis contributed to the sportswear innovation management and collaborative innovation process by combining the lead user method and participatory design and examined it in practice. It opens up the discussion in this underexplored research area regarding the implementation of modern design methods in the sportswear innovation process. As mentioned in the previous section, this direction of

study could be more appropriately done and deeply investigated in a partnership with a sportswear firm.

During the research process, the author noticed other interesting topics that could have been discussed in this research, such as co-designing the meaning of sportswear and design-driven innovation. However, due to the limited time frame for this thesis, and it is less relevant to the research question, these topics were excluded.

Based on the empirical case study, to develop sportswear innovations with a collaborative approach requires a certain level of strategic thinking from sportswear designers. This requirement would call for more attention to the investigation of what new competencies a sportswear designer should have in order to incorporate strategic work when initiating an innovation project. Moreover, the role of sportswear designers in the innovation process could also be examined to provide clear guidelines for the education of modern sportswear innovation.

Finally, the effectiveness of the lead user method and participatory design in sportswear innovation projects should be continuously evaluated and measured in future research. The criteria of measurement in this type of participatory innovation process should also be studied not only for business and result-driven evaluation but also for the value of design and collaboration effectiveness.

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# Appendices

# Appendix 1

Interview questions for Workshop 1.

**Interview Structure & Questions:**

**Topic 1. Workshop planning and content preparation**

- What do you think about the overall workshop planning and content creation? What was challenging? What was inspiring?
- Is there any improvement that can be made in this innovation process?

**Topic 2. The values of the mixed approach**

- How does it like to collaborate with lead user/industry expert in the trend forecasting workshop?
- What are the differences between this approach and your working process?
- What do you think about the outcome of this workshop? Why? Does it have business potential? Does it address customer's needs?
- What are the limitations of this approach?

**Topic 3. The values of the co-creative toolkit**

- In your opinion, what are the pros and cons of the trend forecasting toolkit?
- How did the toolkit help you to generate innovation ideas?
- How do you see the trend forecasting toolkit from the runner/industry's perspective?

**Topic 4. The roles of lead user and industry expert and its connection**

- How do you feel about your role of being a lead user/industry expert in this trend forecasting workshop?
- During the workshop, did lead user/industry expert provide any insight that you found interesting and valuable?

**Wrap-up**

- Is there anything else that you found interesting and we haven't mentioned?





# Appendix 2

Interview questions for Workshop 2.

**Interview Structure & Questions:**

**Topic 1. Workshop planning and content preparation**

- What do you think about the overall workshop planning and content creation? What was challenging? What was inspiring?
- Is there any improvement that can be made in this innovation process?

**Topic 2. The values of the mixed approach**

- How does it like to co-create a running shoe concept with lead user/industry expert in this workshop?
- What are the differences between this approach and your working process?
- What do you think about the outcome of the hacking plan and the prototype? Why? Does it have business potential? Does it fulfill customer's needs?
- What are the limitations of this approach?

**Topic 3. The values of the co-creative toolkit**

- In your opinion, what are the pros and cons of the hacking toolkit?
- How did the toolkit help you to generate innovation ideas?
- How do you see the hacking toolkit from the runner/industry's perspective?

**Topic 4. The roles of lead user and industry expert and its connection**

- How do you feel about your role of being a lead user/industry expert in this running shoe hacking workshop?
- During the workshop, did lead user/industry expert provide any insight that you found interesting and valuable?

**Wrap-up**

- Is there anything else that you found interesting and we haven't mentioned?

# Appendix 3

Questions from the online questionnaire for identifying lead users.

- **What is your gender?** Female, Male, Others
- **What is your age?** Under 18, 18 to 34, 35 to 50, 51 to 70, Over 70
- **How long have you been living in Finland?** Less than 3 year, 3 to 5 years, More than 5 years
- **How long have you been running in Finland?** Less than 3 year, 3 to 5 years, More than 5 years
- **How often do you run in a month during the past 12 months?** Less than 4 times/month, 4 to 8 times/month, More than 8 times/month
- **What is your average distance in one run during the past 12 months?** Less than 3 km/one run, 3 to 10 km/one run, 10 to 21 km/one run, More than 21 km/one run
- **What type of surface do you usually run on?** Treadmill, Street road (e.g. asphalt or concrete), Track, Trails, Other (please specify)

- **Have you ever come up with any new idea that can improve your running experience?** Yes, I have, No, I haven't
- **If your answer of the previous question is "Yes, I have", please describe it. If your answer is "No", please ignore this question.**
- **Have you ever come up with any new idea to modify your running gear so that you can run better?** Yes, I have, No, I haven't
- **If your answer of the previous question is "Yes, I have", please describe it. If your answer is "No", please ignore this question.**
- **How often do you buy a new sportswear product during the past 2 years?** None, 1-6 items/year, 7-12 items/year, Over 12 items/year
- **What is the most frequent reason for you to buy a new sportswear product?** The existed one is old or not functioning., New product is trendy and attractive., New product has new technology., Someone recommends me the product (e.g. friends or online influencers), Other (please specify)

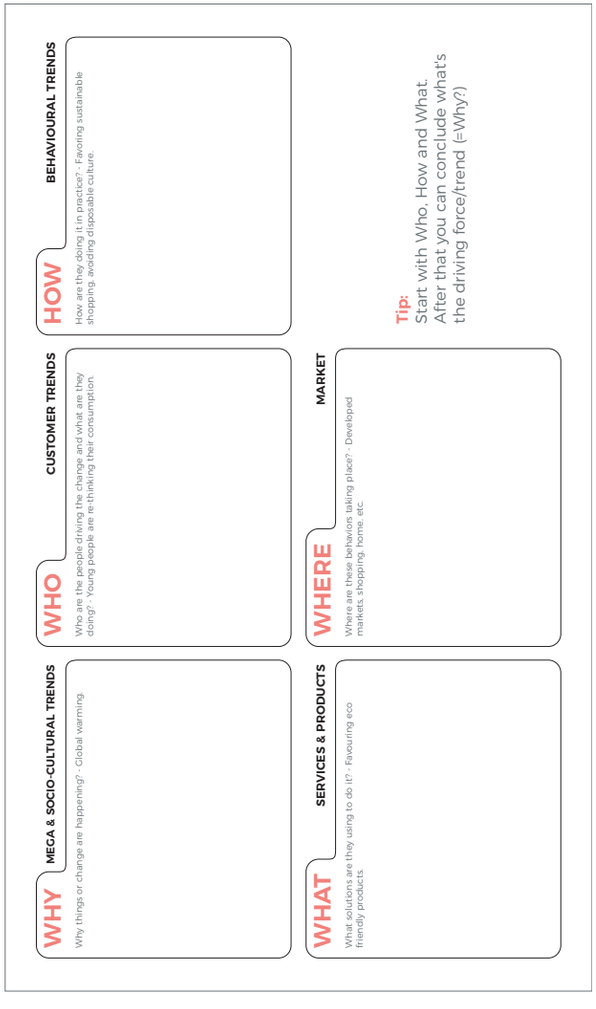
- **Have you noticed any trend that you found interesting in running culture or running sportswear in Finland during the past 3 years?**
- **How do you describe the future running experience in Finland?**
- **Are you interested in participating in a fun co-creation workshop at the end of August?** Yes, I am interested, No, thanks
- **If you are interested, please leave your email for more information.**





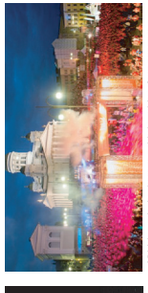
# Appendix 4

The grid canvas (above) and four examples of the 100 trend signal cards (below).




Running apparel, shoes, and gear have become more fashionable, stylish and colorful.

Great Femmes Running Community is a fast-growing community for women who are interested in fast running and wanting to try it out within a group of other females.



Midnight running has become a global trend that allows runners to socialize with people who have similar interests and fitness goals, and act as a great source of group motivation with great music and big cheering crowd.

Behind running injury is usually due to perceived health benefits such as decreasing torque on the hip and knee, shortening step length, increasing mid-to-forefoot strike if you're landing too hard on your heel, and decreasing impact peak on landing.

# Appendix 5

The trend forecasting canvas.

**TREND FORECASTING CANVAS**

**TREND TITLE:**

**SELECTED INDUSTRY:**

**DRIVING FORCES**
Place the trend signal cards that support the trend.

**ON THE HORIZON**
Write down the future scenarios of the trend that might happen in your selected industry.

**Horizon 1**
6-12 months

**Horizon 2**
12-24 months

**Horizon 3**
2-5 years

**FUTURE PROOFING**
Think of implications and opportunities for your selected industry.



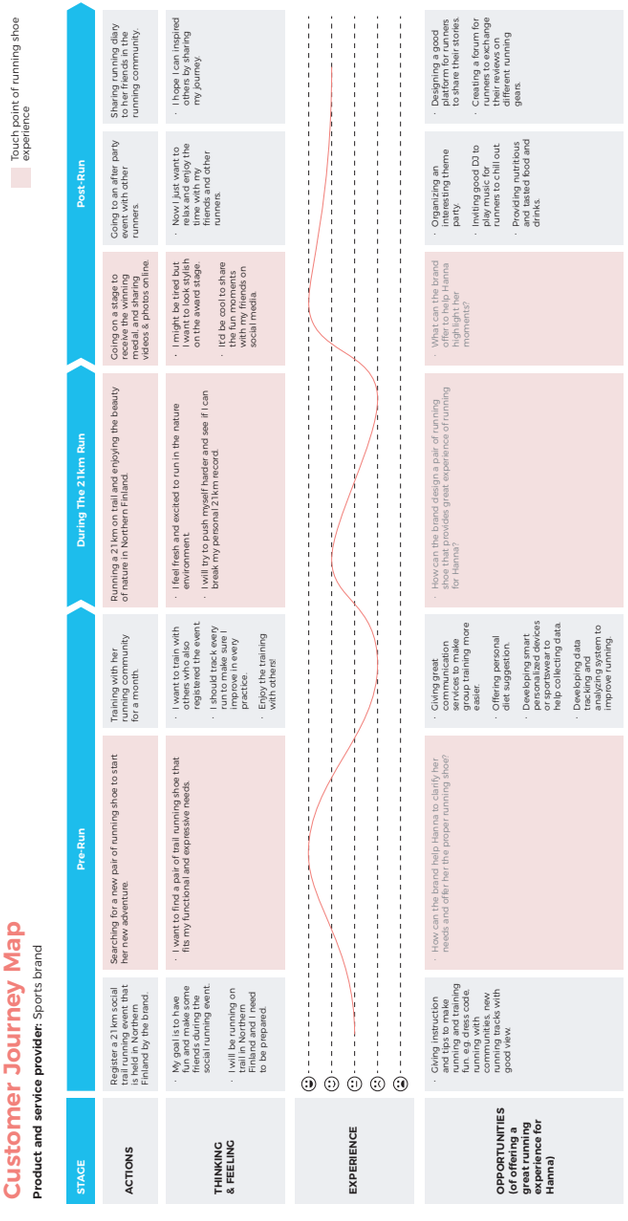


# Appendix 6

The persona canvas that used to co-identify customer needs.

# Appendix 7

Customer journey map canvas that used to co-identify customer needs' in a social trail running event.

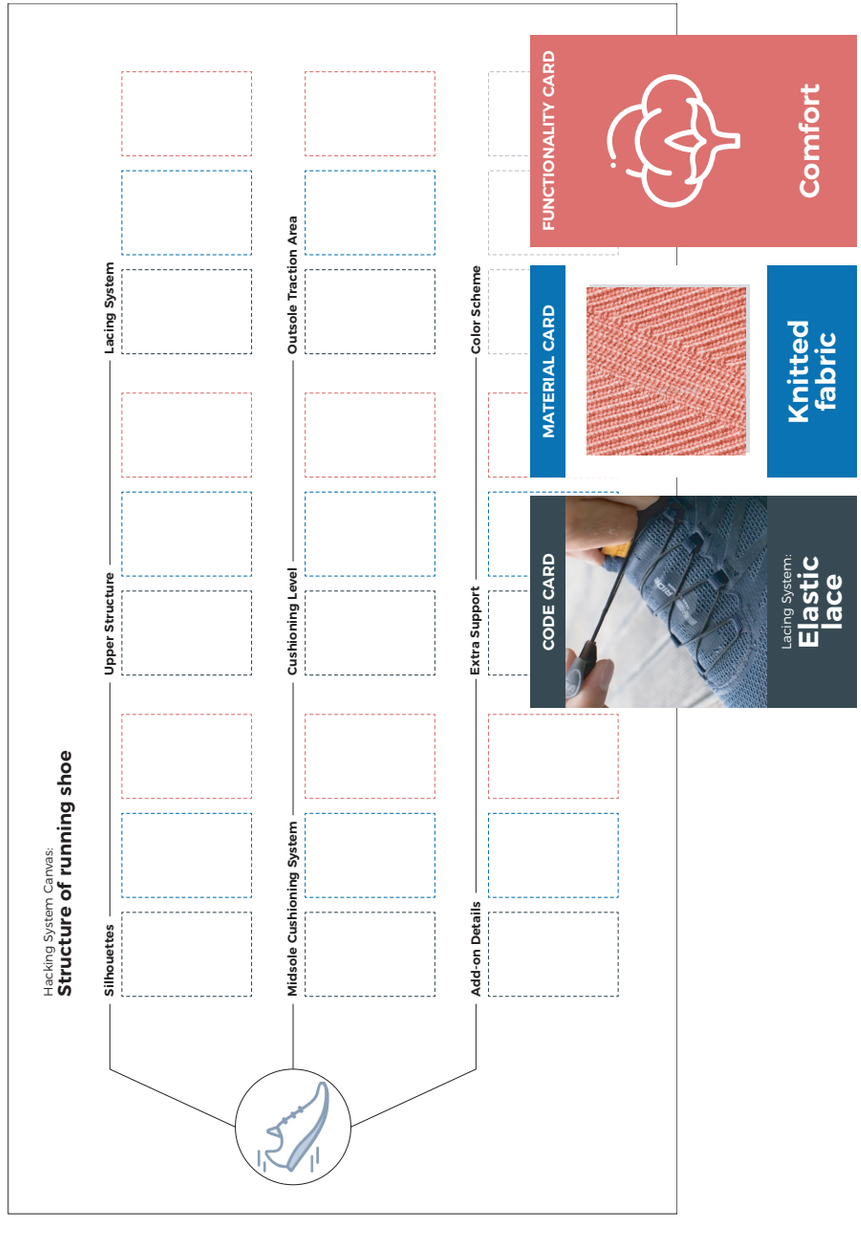







# Appendix 8

The trail running shoe hacking toolkit, which includes three types of code cards and one hacking canvas.



Aalto University