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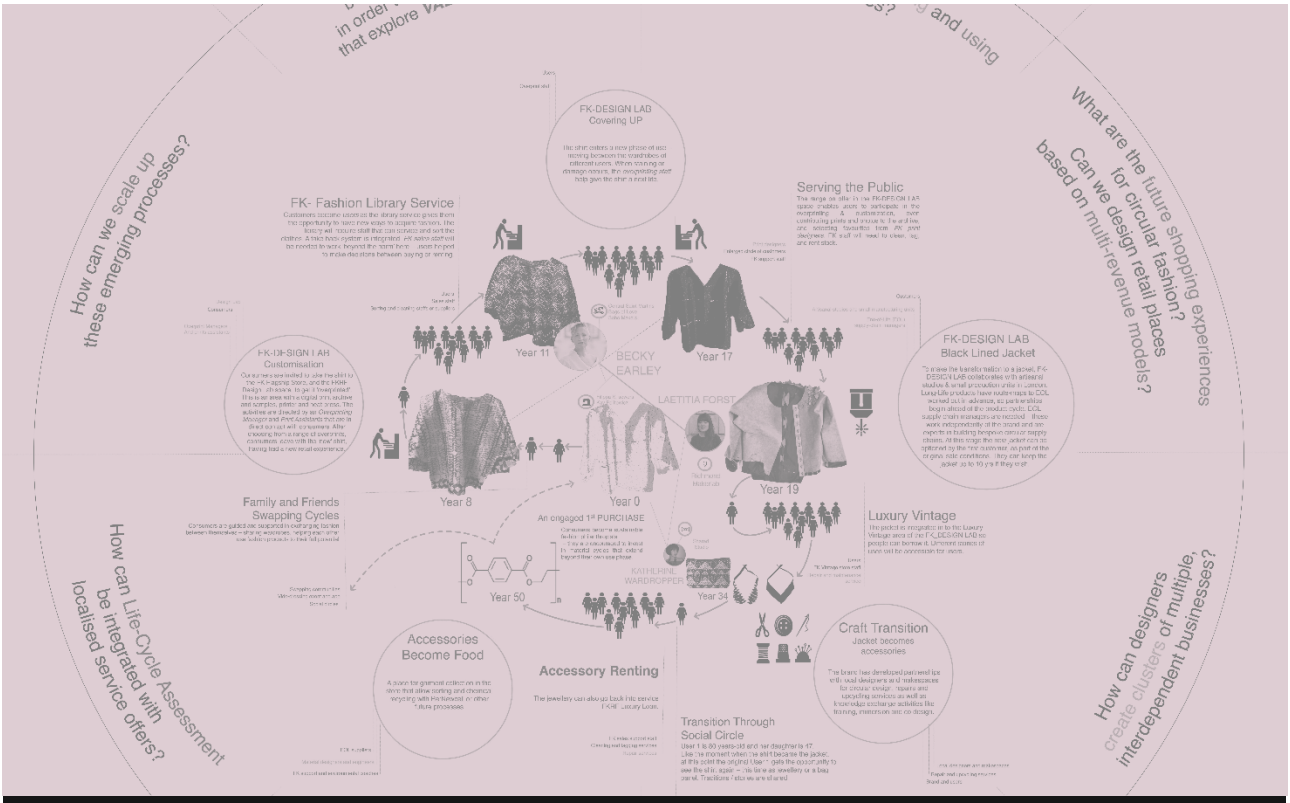

circular design researchers in residence

-a workshops report for the circular design speeds project with Filippa K (2016-2018)

by
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A Mistra Future Fashion Report

Mistra Future Fashion is a cross-disciplinary research program, initiated and primarily funded by Mistra. It holds a total budget of SEK 110 millions and stretches over 8 years, from 2011 to 2019. It is hosted by RISE in collaboration with 15 research partners and involves more than 50 industry partners.

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summary

If you are a fashion brand who wants to be part of the circular economy and who has already begun these conversations within the company, then you will know that becoming 'circular' is extremely challenging. Brands need to collaborate across multiple sectors – and getting the internal design team to do this can be tricky. At the same time, academic researchers and other experts need to find ways to apply and contextualize their knowledge, if they want to contribute their ideas in an impactful and meaningful way to the creation of a less-impactful fashion industry. This report documents the in-residence project that used a workshop facilitation methodology. It brought together a team of academic design researchers based at Centre for Circular Design at University of the Arts London, and a Swedish fashion brand, Filippa K, for what became known as the Circular Design Speeds project[1]. The workshops were also supported by material and lifecycle assessment researchers connected to the Design Theme in the Mistra Future Fashion research programme.

When we began to plan this research in Spring 2015, it was hard to find information on how to design circular fashion textiles. In the space of the last four years, multiple organisations have created circular design guidelines. The work covered in this report adds to these valuable resources by differing in two ways: it explored how to make design decisions that related not only to recyclability of the product but also to the speed of lifecycle, from 'ultra-fast' to 'super-slow'; it also focused on how to design and deliver the process of bringing a range of academic experts into the same room to work alongside the industry designers, to produce circular fashion products. Both elements of the work really challenged the participants to see circular design as an opportunity to change the industry at a systemic level.

The report sets out the plan for creating and testing the tools to support this ambition. It shows what part of the plan worked well, and what didn't go so well. It presents the insights created through the pre-workshops which took place before the project began; the methods and tools developed for the project structure itself, and the key ideas that were generated through the delivery, along with feedback obtained through surveys and interviews. The report includes only minimal details about the final fast and slow prototypes, which were launched at the Disrupting Patterns showcase in London in November 2018 and also shown at Stockholm Fashion District in June 2019. You will these detailed on our project website[1] as well as in the final Design Theme report (Goldsworthy et al 2019), available from the Mistra Future Fashion website[2].

The report concludes a model for Circular Design Researchers in Residence – this is the 'what we would do differently now if we were starting again' version. We hope this will provide a blueprint for those that might follow in similar footsteps – academic researchers and industry partners from all design disciplines and sectors, working side-by-side in the same room, to make real change through creating new products, systems and processes for our future circular economies.

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[1] The Circular Design Speeds project outcomes: www.circulardesignspeeds.com
[2] Mistra Future Fashion: www.mistrafuturefashion.com

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glossary of terms

AVM	Animal, Vegetable, Mineral
CCD	Centre for Circular Design
CDRR	Circular Design Researchers in Residence
CDS	Circular Design Speeds
FK	Filippa K
FR	Front Runners
FKSH	Filippa K Second Hand
LCA	Lifecycle Assessment
MFF	Mistra Future Fashion
rPET	Recycled Polyester
SH	Second Hand
TED	Textiles Environment Design
TT	TED's The TEN
UAL	University of the Arts London
VTO	Value to Others
WS1	Workshop 1
WS2	Workshop 2
WS3	Workshop 3
WS4	Workshop 4

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1 introduction

The CDRR project aimed to create an in-residence workshops model for how circular design and lifecycle speeds can be evolved through close academic and industry collaboration; resulting in new products being brought to the market place.

The Circular Design Researchers in Residence (CDRR) project set out to build and test a model for how an academic team could work closely with an industry partner to explore new research ideas in workshop situations; bringing to market circular commercial products as a result. The project took place between March 2017 and November 2018, and was funded by a strategic award from Phase 2 of the Mistra Future Fashion programme. This report covers the planning and pre-workshop stages, as well as the delivery and the review of the workshops model and tools. It aims to provide guidance to other researchers and industry partners in how to work together on applied and interdisciplinary circular design projects. The report uses workshop data and feedback from online questionnaires and interviews.

1.1 Strategic Project Objective

The CDRR project objective was to enable the practice research from the Mistra Future Fashion Design Theme to be implemented in a real industry context – focusing on speeds of use and maximizing material value retention in fashion products. This industry-embedded study bridged circular design research to a specific company context, in order to create a deeper understanding about academic and industry collaboration, using workshop facilitation methods.

1.2 Anticipated Outcomes

The key workshop outputs were anticipated to be prototypes; both commercial collection items for the Front Runners line at Filippa K, and creative exhibition prototypes by the academic research team. The project also aimed to generate: Scientific Value (e.g. academic papers); impact in the Swedish industry through the Value to Others (VTO) sessions; and spread the ideas and thinking more broadly via communication channels to fashion brands, media and consumers.

Figure 1 Left, the team behind the CDS Project organization. From left to right: Sigrid Barnekow, Kate Goldsworthy, Rebecca Earley and Elin Larsson. Right, the core team behind the design and production of the exhibition prototypes.

2 background & rationale

The changes that the circular economy remit demands mean that every department in a company needs to make stronger external connections; examining supply chains and redrawing them to include new materials and processes that fit within circular systems. Few companies, if any, possess the whole spectrum of knowledge to make informed decisions to adhere to these new models. Many will not act on implementing these models because the economic arguments are not deemed to be strong enough at present. The industry press is full of break-throughs in the technology and the materials that will help make circular fashion a reality. Hence, bridging academic and scientific research insights across to industry partners was recognized as timely and important in achieving the kind of holistic change that the Mistra Future Fashion programme was aiming for. These bridges are key to the systemic shift we are all striving towards (Earley & Vuletich 2015).

2.1 Mistra Future Fashion Programme

The research focus at Mistra Future Fashion for Phase 2 was on the Circular Economy and how to enable today's linear industry to transform into a circular and sustainable one. With a system perspective, the research questions were designed around the bigger picture and the interaction between the elements in the system. With an interdisciplinary approach, the program attempted to understand and progress research on the most relevant areas within the system that needed to change. Four themes curated the efforts: design, supply chain, users and recycling technologies.

This research was based in the design theme, but sought to draw across insights from the other themes, into the brand through the Circular Design Researchers in Residence (CDRR) project. As a strategic project – an award created after the programme had begun in recognition of new ideas that had surfaced through the process and that the board agreed needed exploring further. The project was created to work *in parallel* to the other research questions, with the specific ambition of bridging academic insights to the day-to-day decisions being made within a brand.

Filippa K became the brand where the CDRR project work took place, but the Value to Others (VTO) events that were created to run alongside the delivery, ensured that the ideas were shared and tested with a broader group of Swedish industry stakeholders.

Figure 2 The four Mistra Future Fashion research themes, www.mistrafuturefashion.com

2.2 Centre for Circular Design, CCD, UAL

During Phase 1 of the Mistra Future Fashion programme the Centre for Circular Design (CCD) researchers noticed several things: that getting new ideas about sustainable design through to actual application in real garments for sale on the shop floor was difficult to achieve because of company infrastructures; and that when designers addressed design for cyclability in their workshops (TED's The TEN, card number 2), the biggest measurable gains were always achieved in terms of reducing the environmental footprint of the product. The Textile Toolbox exhibition work also revealed that product speeds – or *clothing rhythms* (Fletcher & Tham 2004) - were an important aspect to consider when designing circular products (Earley *et al* 2016a:111). The gaps in knowledge and practice between these areas could be better addressed by forming close collaborations between different stakeholders throughout the whole supply chain; indeed, exploring totally new supply chains would be essential for circular economies of fashion textiles.

Figure 3 shows the three interconnected themes which emerged from Phase 1 research (ibid:1). These frame sustainable fashion textile design in new ways: through the lenses of material systems, product and process innovation; social, systemic and economic concepts; and the self and shifting mindsets and habits. These themes argue for the varied and layered approach to designing for circularity which can act at all levels of industry and society, with different driving forces. These encompass all aspects of design and celebrate the material, relational and personal challenges which need to be solved in order to achieve circular goals.

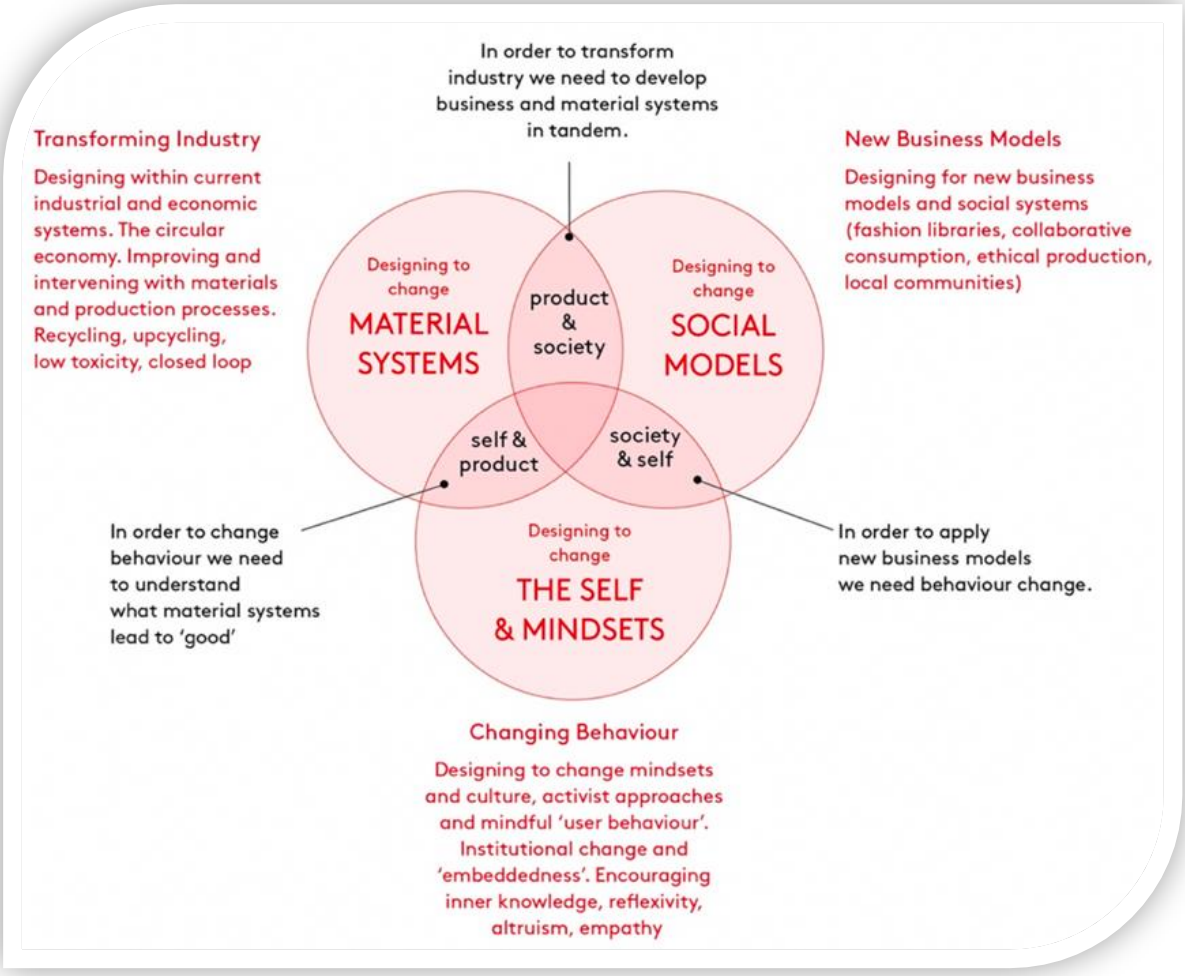


Figure 3 The Materials, Models and Mindsets model, phase 1 Mistra Future Fashion research (Earley et al. 2016a)

2.3 Filippa K and the Front Runners Collaboration

Filippa K was founded in 1993 and is a leading Scandinavian fashion brand[3] who focuses on simplicity, functionality and longevity with their womenswear and menswear collections. It has been developing its sustainability agenda over the last few years by enhancing its focus on quality: "*Our strategy has always been to make clothes that last — both in terms of style and quality. We see simplicity as the purest form of luxury and want to inspire mindful consumption, minimalist lifestyle and equality. Style, Simplicity and Quality are three values that run through everything we do… Quality is part of everything we do, from how our products are designed, manufactured and sold, to how we care for our colleagues, customers and everyone else with whom we interact.*" (Filippa K 2019:8)

The brand began to consider its approach to designing differently for sustainability drivers through its 2014 Front Runners collection, with three knitwear garments. The work, which required new materials and supply chain development, was supported by Sweden's Axfoundation, and sought to establish the Front Runners as a model for bringing cutting-edge ideas to the market place every couple of years: *"The goal is to do this for each of our product groups and to use the lessons learned as a benchmark for all our products. This is a way for us to begin adapting to the circular economy, where we are moving away from linear production models to circular ones in which no waste is created, all steps in the chain are as sustainable as possible and we design products with the perspective that they are designed and created to be recreated".*[4]

The brand went on to publish its internal 'Circular Fashion' framework in 2015, which builds on the classic 4R's of reduce, repair, reuse and recycle loops. "*Circular Fashion is our internal framework for how to adopt to a circular economy, guiding us on how to move away from traditional linear business models towards circular ones, like nature's own ecosystem. It encompasses everything we do within our business: from how we design, develop, produce and build longevity into our clothing to reinvigorating our business models."* (Filippa K 2018)

They rewrote the 4R's:

- **Reduce:** With an honest devotion to circular fashion as a starting point, we strive to create pieces with minimal negative impact that can be part of a closed-loop system.
- **Repair:** We create clothes that last for a long time and take pride in making sure they do. Our Care concept furthers this by promoting garment care methods to our users.
- **Reuse:** We want all our clothes to get a chance to a second, third or fourth life through our Collect concept, Second Hand stores and our Lease concept.
- **Recycle:** We want to make sure that when clothing is worn out we can recycle it into new textile fibres again. (Filippa K 2018)

Elin Larsson, Sustainability Director at Filippa K and founder of the Front Runners work, was part of the Mistra Future Fashion programme from early on, and became a Board Member in 2015. She saw the research collaborations grow during Phase 1, and realised that Phase 2 – with its remit of working towards systemic change for the industry – was an opportunity to work more closely with the UAL academic design researchers in order to apply and test the ideas to produce real outcomes.

[3] Their head office is in Stockholm, Sweden. They are a global brand with their own e-commerce site and 34 brand stores. Filippa K has approximately 240 employees (79% female, 21% male). The annual turnover is around £61.7 million (729 million SEK) (Filippa K 2018:8).

[4] ax foundation, https://axfoundation.se/en/projects/filippa-k-circle/.

3 pre-circular design speeds project formats, tools & results

Since 2011, CCD researchers have been developing creative and playful sustainable design workshop tools to understand, develop and share knowledge and ideas with other designers. These tools originated through practice-led research methods, often involving prototyping, to explore and consolidate research theories. By translating design strategies into both realised fashion *products* and *tools* for engaging others, CCD researchers worked with the Mistra Future Fashion programme towards new ways to achieve circular design and varying lifecycle speed.

3.1 MFF Phase 1

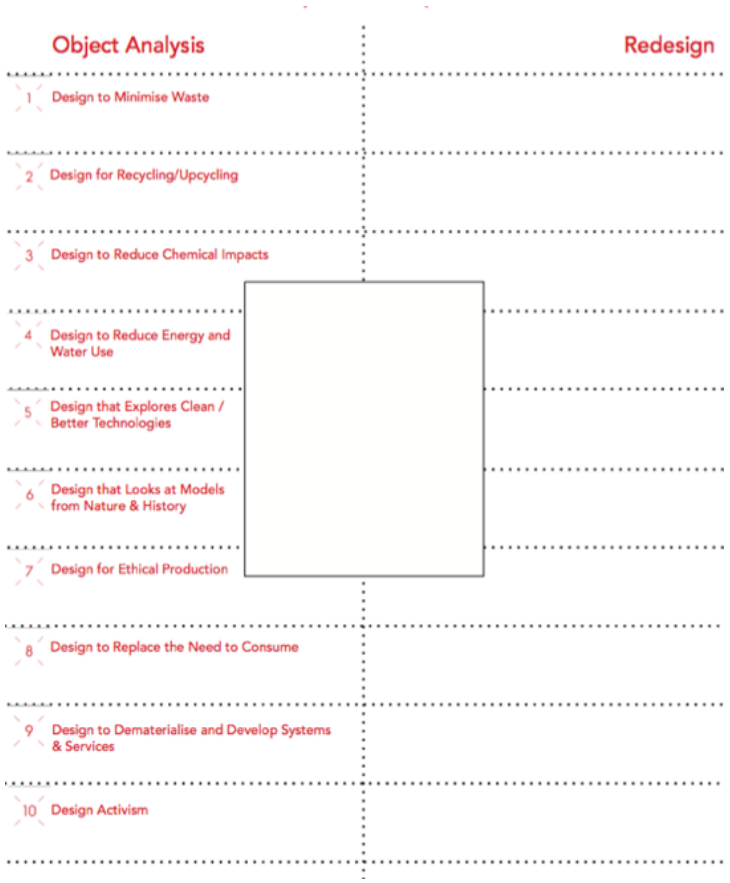
During MFF phase 1 (2011-2015), researchers explored sustainable design strategies for ideation in various commercial environments, including H&M (Andersen & Earley 2014; Earley *et al* 2016b; Earley & Goldsworthy 2015). During Phase 1, TED's The TEN cards were used (Figure 4) to enable workshop participants to analyze existing products in an accessible and playful format, leading to more easily identifying key focus points for subsequent sustainable design decisions. Product redesign outcomes, created using a pre- and post- Higgs Index score (Sustainable Apparel Coalition 2012) varied from 1% to a 41% improvement (Earley *et al.* 2016a:75). In this phase of the research it was noted that concepts which used recycled fabrics and were also recyclable at end of life produced the best scores. In addition, the development and testing of the tools at H&M also led to an improvement in daily decision-making around sustainable design of up to 7%. (For a full description of how THE Ten tool was used in MFF1, please refer to the report, *The Textile Toolbox: new design thinking, materials and processes for sustainable fashion textiles* (Earley *et al.* 2016a).[5])

3.2 MFF phase 2

Phase 1 research paved the way for the next generation of design tools and workshops in Phase 2. These were piloted with designers in three cities - New York, Glasgow and Gothenburg - prior to the commencement of the Circular Design Researchers in Residence (CDRR) Project. The workshops used four garment typologies from Phase 1 LCA research (Roos *et al.* 2015) – a polyester shirt, an outdoor jacket, a t-shirt and some jeans. 24 redesigned concepts were created over a four-month period with 56 industry stakeholders, resulting in insights around both fast garment and slow garments; explored within the framework of materials, business models and user mind-sets. Tools were categorized into two levels – baseline and lifecycle speed – as explained in the paper, *Playing for Time* (Earley & Goldsworthy 2017).

The workshops required the FK participants to think like both designers *and* users – drawing upon their experience in making textiles and products, as well as owning and using them. The workshops also required the academic researchers to think like the industry participants and partners; a design leadership skillset that they had developed and had been reflecting on elsewhere within Centre for Circular Design (CCD) (Earley 2018; Hall & Earley 2019).

[5] Available in PDF format from http://textiletoolbox.com/media/uploads/report01/mistra-textile-toolbox-project-report-2011-2015.pdf



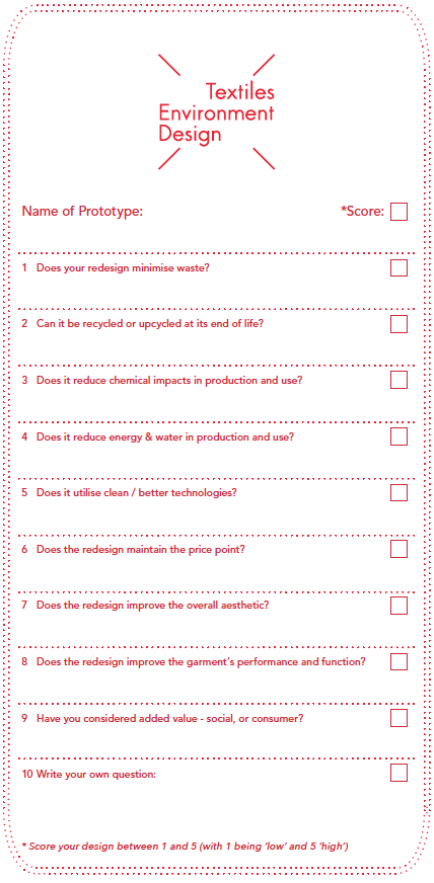


Figure 4 Phase 1 design tools. Top, The TEN cards; Bottom left, Redesign Worksheet; Bottom right, The Garment Checklist

Data collection approaches included the creation of post-it notes wall spaces that noted the object analysis and design improvement ideas; and Speedometer posters that noted the same garments having been designed to adhere to prescribed fast and slow timeframes. Audio recordings and written notes were also created by the facilitators.

3.2.1 Phase 2 Tools

Based on the insights from Phase 1, Phase 2 began with a shift in focus from *sustainable* to *circular* design. After a review of existing strategies and tools (Goldsworthy *et al.* 2017) it became clear that the discourse often related only to the production and use phases. Moreover, lifecycle representations rarely communicate any proportionality in speed or timeframes. When trying to design within a specific context this becomes problematic as it misses vital elements for consideration. 'Speed' can be translated in very different ways if related to different parts of the lifecycle and often a product can therefore have multiple and often counter- intuitive mixes of speeds within a single garment.

Workshop tools were designed to interrogate and question this assumption, and to express a complex set of scientific insights into a form which could quickly communicate starting points for design briefs. In addition to the 'Baseline workshop tools' continued from Phase 1, five new tools were developed iteratively for the Circular Design Researchers in Residence (CDRR) Project through the workshops and are described in Table 1.

Table 1 Insights: Designing for Fast & Slow Materials, Models and Mindsets.

	FAST	SLOW
MATERIALS	> Fast materials are not currently common in fashion textiles (unlike the medical sector). > Finishing details and textile applications suggest changes to the material and product. > The end of life is always the starting point for short life design – the greatest potential for biodegradable materials was found here.	> Lack of industry interest in prolonging the life of clothing; inhibiting the increased usage of durable materials. >Technology has an important role in enabling updatable elements, designing new materials for resisting moth holes, pilling, snagging, staining, odor, or for better drape, lightweight, sun protection; disease resistance, wellbeing, or to help us cope with change.
MODELS	> Services were designed for multiple lives and uses, (limited by existing business models). > Unisex design might help extend the use phase, as well as adaptability and customization**.** **>** Subscription services are important. > Need to be specific about exact timeframe of the product, the number of uses, and the exploitation of people in the supply chain. > Opportunity for ethical production models for short life products.	> Repair became an essential art form here. Connections to artisanal craftsmanship were key to enhancing product lifespan. > Products could change as you age - grow as you grow - evolve as your tastes change. > Products may require different business models for different service-orientated customer needs. > Models to prolong existing products; or to make radical new products
MINDSETS	> Participants often imagined more products and applications for a youth market than for mid or ageing users. > these products should serve an identified need: could be a campaign - ideal format for activism, messaging and communication. This could work well with "living lightly".	> The idea of 'fine wine design' - where the ageing of the product is key to its user value, consciously making visible or invisible the narrative of the product. > Opinions differed around this; some like 'old', whereas some like 'new' looking things. Users need to adjust their mindset to accessing services rather than buying products.

3.2.2 Workshop Formats

The Phase 2 tools were both delivered, tested and prototyped iteratively through workshops. There were three formats: Full day, Half Day and 90-minute.

Full Day Format. The workshop aimed to challenge participants on their understanding of the circular textile economy and fast to slow product lifecycles. The day included using TED's The TEN and the garment typology cards (figure 5, left). After introducing the 'fast' concept, participants selected a Speeding Ticket (figure 5, right), which gave them a specific time frame to aim for. After sharing insights around this fast product, the process was repeated for the 'slow' concept.

Half Day Format. Paying professionals were invited to attend a five-day sustainable fashion course in Manhattan. 32 of the participants took part in the four-hour workshop, which ran twice, on two consecutive days. For this second workshop the one-day format was adapted. The Garment Typology Cards and the Speeding Tickets were used.

90-minutes. This was a tailored 'fast and slow' session given within a full-day sustainable design strategy workshop for a large Swedish brand. The session was titled Manifesto Making: Sustainable Design Thinking. It tested the idea of using a short session on lifecycle speeds to take the participants further with their agenda.

Figure 5 Phase 2 design tools. Left, two of the Garment Typology Cards; right, two of the slow Speeding Tickets (Earley 2017).

3.2.3 Pre-Project Workshop Results

The early Phase 2 results were written up in full in the paper, *Designing Fast & Slow* (Earley 2017). 22 concepts were created during this phase. Fast and slow speeds are both possible and potentially beneficial – environmentally, economically and socially – to large industry stakeholders as well as more niche enterprises. The workshops aimed to discover more about how products should be created to travel quickly and slowly through a cycle. Key insights are summarized below in Table 2.

Table 2 New design tools developed and iterated during workshops in phase 2.

New Phase 2 tools	Description
Garment Typology Cards (Figure 5, left)	The workshops used four garment typologies from phase 1 LCA research (Roos et al 2015) – a polyester shirt, an outdoor jacket, a t-shirt and some jeans.
The Speeding Tickets (Figure 5, right)	Once a baseline for current material and product speed had been established the Speeding Tickets were used to challenge designers to extend material and product life by a specific number of months or years
The Lifecycle Sliders (Figure 6)	The Lifecycle Sliders were used initially with a group of Masters students at UAL who were asked to research and analyze a selection of textile products according to the lifecycle stages along the sliders. This enabled in-depth conversations about raw materials, their 'renewal timeframes', the various processes needed for each material in production alongside scenarios relating to the use and recovery phase. By visually mapping in this way participants were able to see where more appropriate choices might be substituted and where there were obvious mismatches.
The Speedcycle (See Goldsworthy 2017:S1967-S1968)	This visualization of the lifecycle (using proportioned speeds) facilitated understanding of the interrelatedness between cycle stages and impacts. It was designed to illustrate the environmental science standard of 'cost per wear' and was effective in modelling the impacts of short vs long life across the cycle. In future iterations, there may be benefits in including 'scale' of cycle as a further comparative dimension.
The Speedometer (Figure 7)	A playful tool which enabled the participants to understand the current speed of the material and product, by drawing upon their existing knowledge of garments. The tool gave them insight into how the length of ownership versus number of uses can inform design decisions.

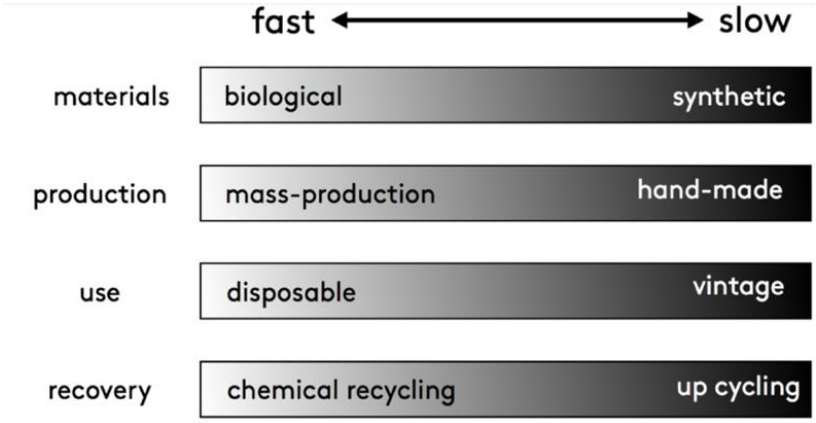


Figure 6 Phase 2 design tools, Lifecycle Sliders (Goldsworthy 2017)

Figure 7 Phase 2 design tools, The Speedometer (Earley 2017)

The full toolbox, with the Phase 1 and Phase 2 tools is presented in Table 3. In this table the tools that were developed during the CDS workshops at Filippa K are also included – in bold, underlined font. All the tools, how they were used, and the results they produced, are presented and summarized in the next section - section 5 - of this report.

Table 3 CCD's updated sustainable design toolbox – with the new CDS tools added in (bold font).

LEVEL	TOOL	AIM
A. Values Tools	**i.** Green Cards **ii.** Sutra Stitching iii. Face Mapping Stickers *(WS1)* **iv.** Barriers to Opportunities Worksheet v. **Feedback Postcards** *(WS1)* *vi.* **Wardrobe Disclosure Worksheet** *(WS1)*	To create buy-in and commitment based on a common understanding of personal and company values; team-building & problem-solving approaches.
B. Baseline Tools	i. TED's The TEN Cards *(WS1)* **ii.** The Now Wall iii. Redesign Worksheet *(WS1)* iv. Redesign Checklist v. Lifecycle Product Mapping Worksheet *(WS1)* *vi.* **LCA Checklist** *(WS4)*	To create a broad understanding of sustainable design potential; to see how design decisions can be made differently for a best-selling product to reduce its footprint. Basic use of the lifecycle to understand all product impacts.
C. Lifecycle Speed Tools	i. Garment Typologies Cards ii. Speeding Tickets *(WS2)* iii. Lifecycle Sliders iv. Speedcycle v. Speedometer vi. Lifecycle Speed Redesign Worksheet *(WS2-3)* vii. **Fast Garment Cards** *(WS3)* viii. **Materials Recovery Cards** *(WS3)* ix. **Garment Speedometer Cards** *(WS3)* x. **Thinking Big Cards** *(WS2)* xi. **Barriers & Opportunities Cards** *(WS2)* xii. **New Materials Cards** *(WS3)* xiii. **Myth-Busting Cards** *(WS3)* *xiv.* **Lifecycle Hotspots** *(WS4)*	To create an understanding of a more detailed approach to lifecycle design for circularity and the benefits and trade-offs at different stages of life; to use playful tools to try out design ideation for both fast and slow speeds.

4 design of the in-residence workshops

The following section details the intended aim, content and timings for each of the four workshops. Each workshop took place over two days; four workshop trips to Stockholm were planned in total (Table 4). Each workshop is presented below in detail, in table form, showing the design of the day, session by session with timings. Development work on the Front Runners products would also take place at the brand between trips. Whilst these timings were not always strictly adhered to on the day, reviewing the plan for each day is still the best way to understand the different tasks that the researchers set for the participants; and how together these create a holistic and comprehensive offer.

A single innovation diamond shape (figure 8) is used to describe the overall aims of the workshop – to clarify how each workshop contributed to the innovation process that the Front Runner team were going through. Workshop 1 was the main session for exploring the overarching idea of fast and slow circular speeds. Workshops 2 and 3 were more about refining the ideas that had been developed between workshop trips and clarifying the communications messages. Workshop 4 was about using LCA to check

that the ideas being developed were heading in the right direction as well as formatting the ideas so that the MFF LCA experts could review.

Table 4 Original CDS workshop plan.

Workshop	Workshop 1	Workshop 2	Workshop 3	Workshop 4
Title & Date	**Meet and Map** 14th -15th March 2017	**Thinking Slow** 3rd - 4th May 2017	**Thinking Fast** 20-21st June 2017	**Thinking Fast & Slow** 10-11th October 2017
Aims:	Team meet each other to understand the project. Some key concepts/methods are explained & tested. This is a taster workshop to get the team thinking.	Explore the idea of the super-slow fashion product through different garment concepts and speeds, using the lifecycle. Be inspired by the academic research case studies around slow.	Explore the idea of the ultra-fast fashion product through different garment concepts and speeds, using the lifecycle. Be inspired by the academic research case studies around fast materials.	Bring products to the table & review progress together. Exploring any problems and new insights arising. Can we solve them together and share the findings to date?

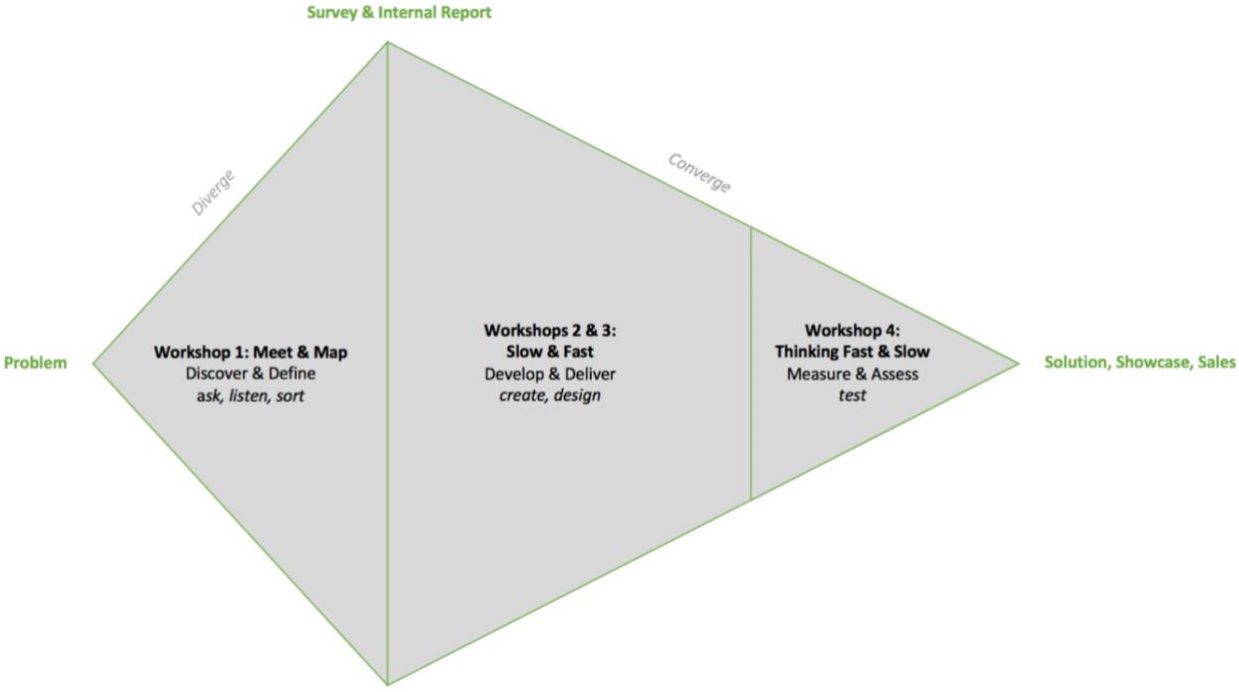


Figure 8 The design of the four workshops following an innovation diamond shape

4.1 Where, who, when and what?

The workshops all took place in the showroom at the Filippa K head office: Söder Mälarstrand 65, 118 25 Stockholm, Sweden. They were scheduled to take place between March 2017 and October 2017 (but actually ran over to March 2018). The academic team travelled over to Stockholm for each of the four workshops. The Filippa K participants were from the internal Front Runners team. The Mistra Future Fashion (MFF) programme team - Sigrid Barnekow (Programme Director) and Malin Wennberg (Communications Manager) - were present at times to support and observe parts of the process. This report refers at times to the 'core project team' – these were the London team, the MFF team, and Elin Larsson from Filippa K. The core team met after each workshop finished to debrief and discuss next steps, as well as communication and Value to Others (VTO) activities.

4.2 Workshop 1: Meet and Map

Aim: A chance for everyone to meet each other and to understand what the project is about. Some key concepts and methods were explained and tested with the group. This was a taster workshop that got the team thinking and asking questions.
Day 1: A series of small workshop sessions to inspire and build the team approach.
Day 2: 30-minute review sessions with smaller teams, using the worksheets produced on day 1.

Table 5 Workshop 1 timings and tasks, days 1 and 2.

Workshop 1 Day 1 / Timing & Task	A series of small workshop sessions to inspire and build the team approach
09:00	Overview of aims for the project and the day in detail (60 minutes).
10:00	Postcard Exercise (30 minutes).
10.30	UAL presentation (45 minutes). FK presentation (45 minutes).
12:00-13:00	*Lunch Break*
13:00	Designing for User Exercise (60 minutes).
14:00	Face Mapping Exercise. (60 minutes).
15:00	Our Lifecycle Knowledge Exercise (30 minutes).
15:30	Materials Taster Session (30 minutes).
16:00	Survey setting (5 minutes) and End

Workshop 1 Day 2 / Timing & Task	30-minute review sessions with smaller teams, using the sheets produced on day 1
10:00	Face Mapping (Expertise Map) (30 minutes).
10:30	Designing for the User (30 minutes).
11:00	Lifecycle Knowledge Maps, FK Product (30 minutes).
11:30	Materials taster Feedback notes (30 minutes).
12:00-13:00	*Lunch Break*
13:00	Draft workshop plan and mission statement (90 minutes).
14:30	Finalizing the Mission Statement (90 minutes).
16:00	*- End -*

4.3 Workshop 2: Thinking Slow

Aim: Explore the idea of the super-slow fashion product through different garment concepts and speeds, using the lifecycle. Be inspired by the academic research examples around slow.
Day 1: Designing slow garments. What decisions do we make that determine the longevity of a garment?
Day 2: In making a slow Front Runners garment, what are the decisions we can make to make a super-slow garment?

Table 6 Workshop 2 timings and tasks, days 1 and 2.

Workshop 2 Day 1 / Timing & Task	Designing slow garments. What decisions do we make that determine the longevity of a garment?
09:00	Introduction to Workshop 2 (30 minutes).
09:30	UAL presentation (45 minutes). FK presentation (45 minutes).
11:00	Workshop session 1: Garment Baseline (60 minutes).
12:00-13:00	*Lunch Break*
13:00	Case Study: Shirt Stories - Top 100 shirts (60 minutes).
14:00	Workshop session 2: Thinking Big (60 minutes).
15:00	Workshop session 3: Story Telling (60 minutes).
16:00	Workshop session 4: Barriers & Opportunities (30 minutes).
16:30	*- End -*

Workshop 2 Day 2 / Timing & Task	In making a slow Front Runners garment, what are the decisions we can make to make a super-slow garment? (Roundtable discussions in core groups)
10:00	Session 1, Material (60 minutes).*?*
11:00	Session 2, Production (60 minutes).
12:00-13:00	*Lunch Break*
13:00	Session 3, User (60 minutes).
14:00	Session 4, Recovery (60 minutes).
15:00	Logistics and planning (60 minutes).
16:00	*- End -*

4.4 Workshop 3: Thinking Fast

AIM: Explore the idea of the ultra-fast fashion product through different garment concepts and speeds, using the lifecycle. Be inspired by the academic research examples around fast materials.
Day 1: Designing fast garments. What decisions do we make that determine the fast speed of a garment? What new materials are out there? What can LCA tell us?
Day 2: In making a fast Front Runners garment, what are the decisions we can take to make an ultra-fast garment?

Table 7 Workshop 3 timings and tasks, days 1 and 2.

Workshop 3 Day 1 / Timing & Task	Designing fast garments. What decisions do we make that determine the fast speed of a garment?
09:30	Introduction to Workshop 2 (15 minutes).
09:45	What have we been doing? (15 minutes).
10:00	Materials update (30 minutes).
10:30	Case Study: RISE paper textile innovations (30 minutes).
11:00-12:00	*Lunch Break*
12:00	Workshop session 1: Six Short Life Scenarios (60 minutes).
13:00	Case Study: Fast & Light - research talk (45 minutes).
13:45	Workshop session 2: Elevator Pitch & Crit (60 minutes).
14:45	Myth Busting: LCA Insights (30 minutes).
15:15	Workshop session 3: Voting (20 minutes).
15:35	Outro: Wrap up & next steps (10 minutes).
15:45	*- End -*

Workshop 3 Day 2 / Timing & Task	In making a fast Front Runners garment, what are the decisions we can take to make an ultra-fast garment?
08:00	VTO - Value to Others *(off-site event)*
10:30	Session 1, Marketing and the FK Fast Story (30 minutes)
11:00	Session 2, Materials & Recovery (60 minutes).
12:00-13:00	*Lunch Break*
13:00	Session 3, Production & Logistics (60 minutes).
14:00	Session 4, Use & Business Models (60 minutes).
15:00	*- End -*

4.5 Workshop 4: Thinking Fast & Slow (LCA)

AIM: Bring the products to the table to discuss the progress on the prototypes and review using lifecycle assessment frameworks. What problems and insights did we finding in the process? Can we solve them together and share the findings to date?
Day 1: Reviewing the progress of the CDS project and the development of the prototype work.
Day 2: Communication plans for the outcomes and discussing the key LCA insights.

Table 8 Workshop 4 timings and tasks, days 1 and 2.

Workshop 4 Day 1 / Timing & Task	Reviewing the progress of the CDS project and the development of the prototype work
09:00	Where are we now? (60 minutes).
10:00	UAL update (60 minutes).
11:00	FK update (60 minutes).
12:00-13:00	*Lunch Break*
13:00	LCA Mapping & Insights (165 minutes).
15.45	Outro: Wrap up & next steps (15 minutes).
16:00	*- End -*

Workshop 4 Day 2 / Timing & Task	Communication plans for the outcomes & key LCA insights
10:00	Communication Plans (60 minutes).
11:00	LCA Review: Fast (60 minutes).
12:00-13:00	*Lunch Break*
13:00	LCA Review: Slow (60 minutes).
14:00	Discussion (60 minutes).
15:00	*- End -*

5 workshop results

The workshops were planned in advance, based on sessions conducted earlier in Phase 2 (see pp.12-17). This section of the report describes and summarizes what happened in each CDRR project workshop session. It also notes the activities *between* the workshops, which was where the individual participants did their own development work.

A wide range of data was collected; this section primarily uses the audio transcriptions and photographs from the workshops, the researcher's notebooks, and the interviews after the project with three FK participants. Some survey data was used as well; an online survey was conducted after the first workshop only. Workshop 1, the Meet and Map 'warm up' trip was transcribed in full, and the notes made into an internal report which was circulated to all CDRR project participants in the period between workshops 1 and 2. After that, sharing data files online (e.g. photographs of the worksheets from the sessions) and Skype calls became a more immediate way to progress ideas and check in. A *Concepts & Samples* internal report (January 2018) was also produced about the academic design concepts and shared with the FK team to help them understand how the more conceptual, academic work was evolving with the CCD researchers.

5.1 **Workshop 1 Results:** 14 & 15 March 2017

DAY 1. In the first sessions the aims for the project and the day were introduced in detail. What is this and how will it work? Personal introductions were followed by a very detailed visual and verbal presentation which gave a description of the project's purpose, intention and goals, asking 'What does fast & slow mean for THIS company?' A postcard exercise (figure 9) provided an immediate measure of the individual participants' feelings at the outset, in response to the stated aims of the CDS project. Having introduced the concepts of 'fast' and 'slow' fashion as an aim for the FK team to assimilate in the development of prototypes during the project, the postcards revealed an almost unanimous concern about 'fast' in an FK context.

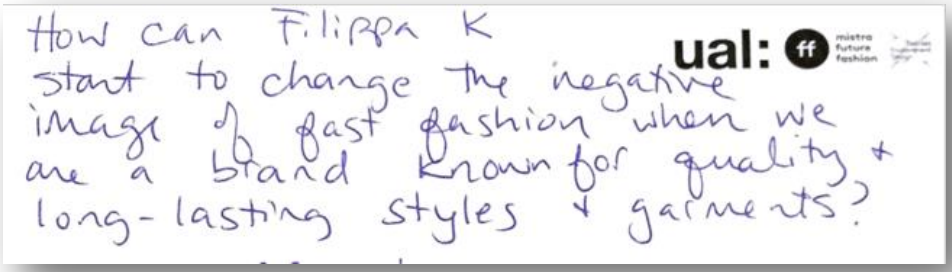


Figure 9 Details from one of the postcards completed by FK participants.

Next, the UAL researchers presented the project from their perspective – highlighting the goal to shift material flows from a linear into a circular structure, with the dimension of understanding more about speed. Three guiding principles were presented as kind of manifesto for the project:

1. Open or closed loops
2. Context for individual garments which have different identities can provide a baseline for new Lifecycle Assessment (LCA) insights
3. understanding speed in relation to the *whole* lifecycle.

In the FK presentation Elin Larsson reflected on the Front Runners journey to date, responding to questions set by the UAL researchers. She concluded by likening the fast prototypes to the role concept cars play in the automotive sector.

In the Designing for the User exercise (figure 10) we asked 'What clothes work and what doesn't, and why?' The participants had been asked to bring in an FK garment that they own and wear a lot, and one they don't wear at all.

Figure 10 Workshop 1. Detail from the blank Designing for the User / Wardrobe Disclosure Worksheet

The first objective was to look at garments as consumers and say why they perform and wear well or not; second - to provide perspectives for designers to assess future design-driven decisions. What common issues seemed to link the preferred garments? Adaptability – a garment that can be worn on beach trips

and skiing trips alike; classic performance - easy to wear and quality. What differences seemed to link the preferred garments? Some improved with washing, some were too nice to wear and users were afraid to damage them. What common issues seemed to link the unworn garments? These seemed harder to categorise. Not successful for a broad range of reasons: the colour, print, material choices 'don't work'; garments that 'stepped outside comfort zone', trying something new, but these choices not working.

In the next exercise - Face Mapping[6] – the question asked was, 'What expertise do we have in the room*?* The aim was to use a lifecycle map (figure 11) to establish what expertise might be missing in the project by placing their own face stickers on to the areas of the parts of lifecycle they felt they had good knowledge of (figure 12). The group worked out during the exercise that they might need: a representative from FK 'Second Hand' to participate; someone to offer advice on clothing care at point of retail; a digital point of view in communication of the final ideas to the audience; a warehouse to represent 2nd hand things coming back from collections.

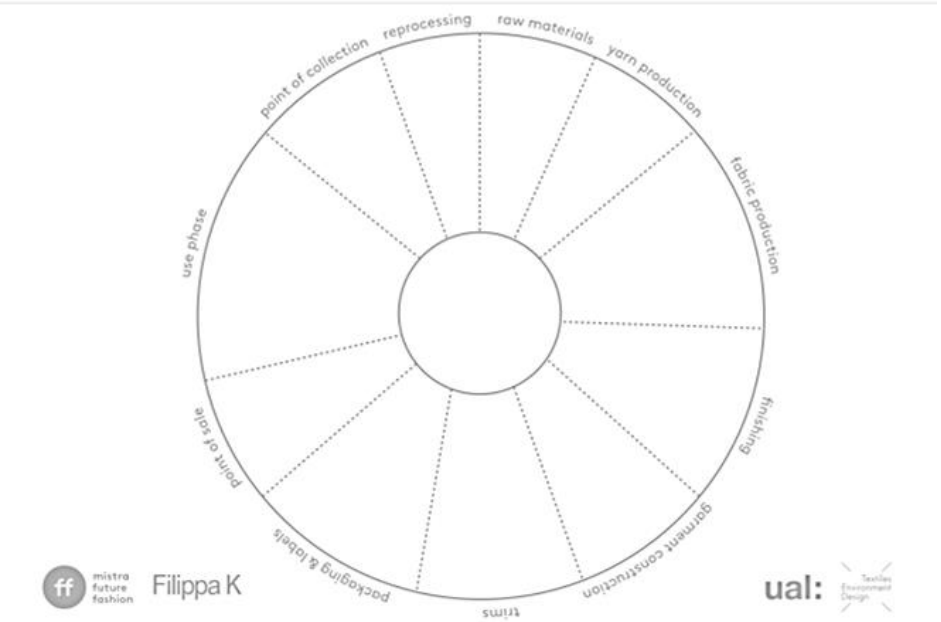


Figure 11 Workshop 1. The blank garment lifecycle redesign worksheet

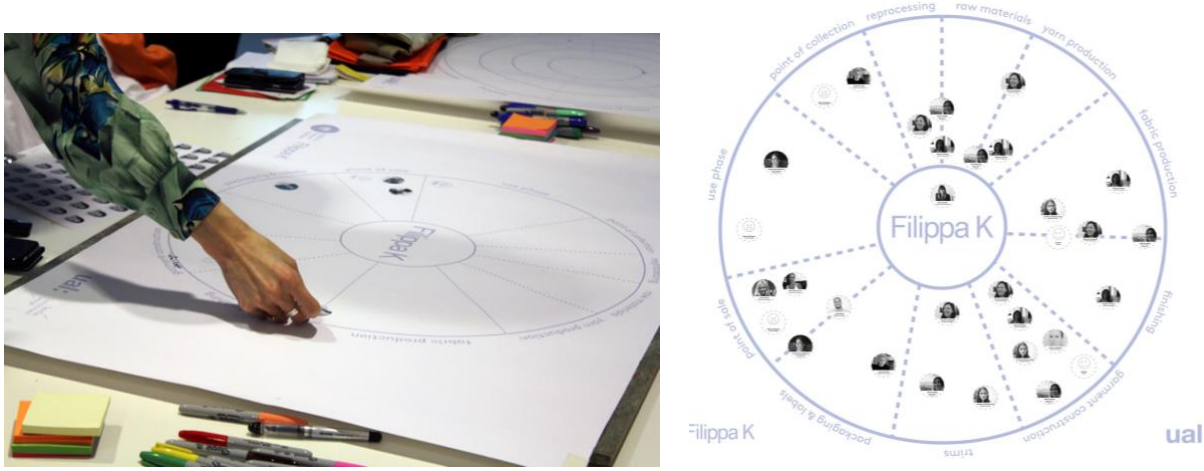


Figure 12 Left, The Face Mapping exercise; right, the filled-out worksheet showing the spread of expertise in the room

6 This tool was developed by CCD researcher Dr. Rosie Hornbuckle for the Trash-2-Cash project. See 'What Else do we Know?' (Hornbuckle 2018)

The following exercise was about mapping the knowledge we had about the lifecycle of FK products. The researchers explained that two current FK Front Runners garments have been selected (in the lunch break) by Elin and a few other participants, for 'object analysis', to capture as much detailed information as possible from them as they currently exist. We worked with a Man's black FR Coat to represent a 'long lasting' garment (Fall 2016); a unisex orange cotton FR T-shirt to represent a 'seasonal' garment (2016). All inputs were recorded on post it notes and the map to enable lifecycle assessment discussion around the effect of different decisions (figure 13). The session ended with the researchers highlighting the need to set the first parameters for the fast and slow products; other decisions will follow quickly after these are made.

The Materials Taster presentation by was intended to make the researchers prior textile research work accessible to FK participants, ahead of the (next) trip with samples in May 2017. A classification of materials as 'fast' and 'slow' was offered, along with the framing of materials as either 'animal', 'vegetable' or 'mineral' (AVM). This reclassification stimulated some intense discussion in the room, particularly the idea that materials can crossover: a bio source (fast) can be turned into synthetic (slow and possibly full of chemicals); a natural source then becomes a polymer.

Day 1 ended with setting the survey questions. We asked participants to think about what questions should be included. We then adapted the original questions to include some suggested by FK participants. The questions and answers, collected on Survey Monkey in the days after the workshop, were shared with the participants in the first session of workshop 2.


Figure 13 The Lifecycle Knowledge Mapping session

DAY 2. The day 2 sessions were held in a different room, where the core team were sat around a table, with different 'theme' team groups from FK joining for the session at an allotted time. In the Reflection on the Face Mapping (Expertise Map) session the group discussion included: 'Who is missing from the project? What is 'design at FK? How does the change in the company affect this project? What about the worksheet from the session? How can the project take-up and buy in from participants be ensured?' This session closed with the core group agreeing on the need for joined-up reporting processes, and a strategy for communicating internally and externally, that recognizes the range of collaborations the project is hosting.

In the Reflection on the Designing for the User session the researchers reminded FK that we are asking what does 'fast' mean at FK? Ideas were discussed around the potential for two different ways to go - carry

on with the FR route (new prototypes for fast) - or to innovate by adding value to the second hand and leasing offers. The FK team were keen not to challenge the customer with new 'fast' offers in store; comments made were about being mindful of the customer's attitude. A multifunctional garment – with comfort and ease, was said to be desirable.

In the Reflection on the Lifecycle Knowledge Maps session it was noted that the FK team felt there had been a real advantage in looking at all the details in this holistic way. The researchers highlighted that every product has 'activity' in every section of the lifecycle, it is the but *flow between departments* that can become *circular design.* How this develops will be special and unique to the FK group - is a way of setting questions for one another. It became clear for participants that communications between areas of expertise are vital and collaboration with the supply chain should be built into the project brief. The researchers noted we had been talking about designing for three conditions:

1. Long Life - designed for longevity and staying with each consumer for a long time
2. Designed for longevity but staying with each consumer for a short time (based on a service model with a regular product - a parallel business model for extra lives)
3. Short Life - Designed for fast use and staying with each consumer for a short time. (Developing a convincing material is the game-changer here. 'Paper' and 'fast' are loaded terms).

In the Reflection on the Materials taster Feedback session it was noted that this session had been really effective in getting the FK designers to reconsider their material choices. This AVM classification was first used in the 1600's; the 'Systema Naturae' (1735) by Swedish botanist Linneus became the basis for a popular children's quiz. A discussion followed in which the FK went through the AVM material types and highlighted what they currently use and why they don't use other things. This session concluded with a conversation about the user and levels of knowledge and just how much people in general wish to know, or not.

The Drafting the Mission Statement and Workshops Plan session got merged into the next session, due to previous sessions over-running. The Finalizing the Mission Statement session was between the core project team, and focused on summarizing the key decisions from the workshop activities and identifying actions between partners. The highlights included:

- The prototypes should be for both women's and men's collections
- The storytelling for each scenario should have the input of all participants – ideally a template will be shared upfront and example showcasing
- The SLOW workshop will be four speed scenarios – for 10, 20, 50 and 100 years.

FK agreed to share their decision on the type of garment and preferred materials, including rationales for why these have been selected, in advance of the next workshop.

BETWEEN THE WORKSHOPS (March – May 2017). After the first workshop ended, the FK team had two months to progress the ideas. In the interviews with the three FK participants, conducted after the project had ended, the activities and issues during this largely undocumented period were discussed. For Elin, this phase involved a lot of communicating across the company. She went on to explain more about the importance of having support from internal stakeholders; and working through this part of the process alone, without the UAL researchers being 'in-house'. The two FK designers talked about the process moving between making progress on the sourcing of materials, and the push and pull of design ideologies.

WORKSHOP 1 SUMMARY. This first workshop explored the following questions:

- What does 'slow' and 'fast' fashion mean to the staff and the company?
- What is the value of prototyping new, circular fashion ideas?
- What 'fast and slow' clothes do we each own?
- What circular fashion expertise do we have in the room, and who are we missing?
- What do we know about the lifecycle of previous Front Runner garments?
- What new understanding do we gain when we look at materials as either 'animal', 'vegetable' or 'mineral'?

>> This workshop resulted in the participants questioning preconceptions about what 'fast' and 'slow' fashion could mean. They learned how to use a lifecycle map to examine a product, and were introduced to the idea of what 'speed' might mean when selecting appropriate materials.

5.2 Workshop 2 Results: 3 – 4 May 2017

DAY 1. An overview of the next two days was given and a reminder about the research question. The specific aims for workshop 2 were noted; creating more shared knowledge about long-life or 'slow' fashion design and generating ideas to enable a detailed design brief for a Front Runners product. A single FK garment formed the centerpiece for the two-day process where research questions about material, production, use and recovery would guide the group's ideas towards the design brief.

Elin reported to the room on the progress made at FK since the last workshop. A series of bullet points were presented which had led the thinking towards a unisex bomber jacket, reversible and made form 100% recycled polyester - a potential "wow" product, but one that reached a reasonable price point and sales volume. The UAL researchers then defined fast and slow materials, using the survey feedback and having run their own research 'design stories' through the Lifecycle worksheet process. The review first categorized materials into past, present and future columns (Table 9).

Table 9 Categorization of materials by the researchers into past, present and future groupings.

Past	Present	Future
Skins	Recycled Cotton (mechanical)	Recycled Cotton (chemical)
Bark	Flax / Linen / Hemp / Ramie	Apple Fibre
Wood	Recycled PES / PET (mechanical)	Orange Fibre
Felt	Polyester / Polyamide	Olive leaf tanned leather
	Wool / Alpaca / Cashmere Silk	Mushroom Leather
	Modal / Lyocell / Cupro / Viscose / Rayon	Cork
	PLA / Milk Fibre / Seacell	Pineapple Leaf
	Monocel / Thermolite	Non-woven Fabrics
	Acrylic / Acetate / Tri-acetate	
	Elastan / Spandex	
	Bamboo Viscose	
	Recycled Tyre Rubber	

Next, the FK participants responses to the survey around what slow and fast materials were about for them were presented (Table 10).

Table 10 FK's Pre-workshop survey responses around what they think fast and slow materials are.

Slow materials were defined as…	Fast materials were defined as…
… expensive & good quality, material type doesn't really matter	… poor quality synthetic fibres
… quality, no matter what material, is the most important factor	… cheap polyester, cotton, acrylic
… slow would be something synthetics or regenerated I guess	… polyester, viscose, cotton
... it can be 100% natural fibre or synthetic with natural blends	… cotton jersey or seasonal colored synthetics
… high quality, and traceable, wool, cotton, silk, alpaca	… cheap rayon/viscose produced in China
… technical synthetic fabrics	… but I know that synthetics from oil are very SLOW!'
… hand crafted leather, wool, silk and cotton	
… a really good cotton denim or a timeless wool knit	
… recycled synthetics or bio based	
… materials connected to the human story of how they are made	

Finally, the researchers offered material definitions around slow and fast materials - based on the material qualities to look for, rather than the fibre origin (Table 11).

Table 11 Fast and slow material qualities and characteristics to look for, as suggested by the researchers.

Speed	Characteristics
Slow materials: Non-Renewable Petroleum Based Fibres. Produced with fewer chemicals, less water and energy; Recycled or/ and recyclable, produced locally or/ and ethically…	… expensive … high quality … traceable … hand crafted … timeless
Fast materials: Renewable & Biodegradable Plant & Animal Fibres. Produced with fewer chemicals, less water and energy either locally and/ or ethically	… cheap … poor quality … opaque supply chain … mass produced … seasonal

In the Garment Baseline session, the participants explored what they knew about the current lifecycle of a selection of FK garments. Using the slow garment selected by FK, this workshop created two teams on tables to map out the current ideas of the group. This session brought all the knowledge, ideas, assumptions, limitations and innovations to the fore, and placed them within the worksheet structure (Figure 14, top). This helped identify where more innovation and ideas can be built into the thinking.

After lunch, Professor Becky Earley presented a research case study, which was made open to all FK staff. This looked at her archive of extended-life polyester shirts, and asked, 'are there ways to use print to extend life at FK?' The talk, *Shirt Stories: Narratives for Design & Longevity in Textile Practice Research*, was written with the aim of opening up the FK thinking – what other ideas are out there that can be built into the FK slow garment? This session was also about ensuring that the blue-sky research being conducted by UAL is always presented at workshops. The aim was that when participants are not restricted by logistics, a cross-pollination and deeper collaboration can be achieved. In the 'Thinking Big' session that followed we asked 'What future global scenarios could affect the way we design fashion?' The participants were challenged to think about more extreme time frames and global / environmental situations, which had been written on cards by the researchers (Figure 15).

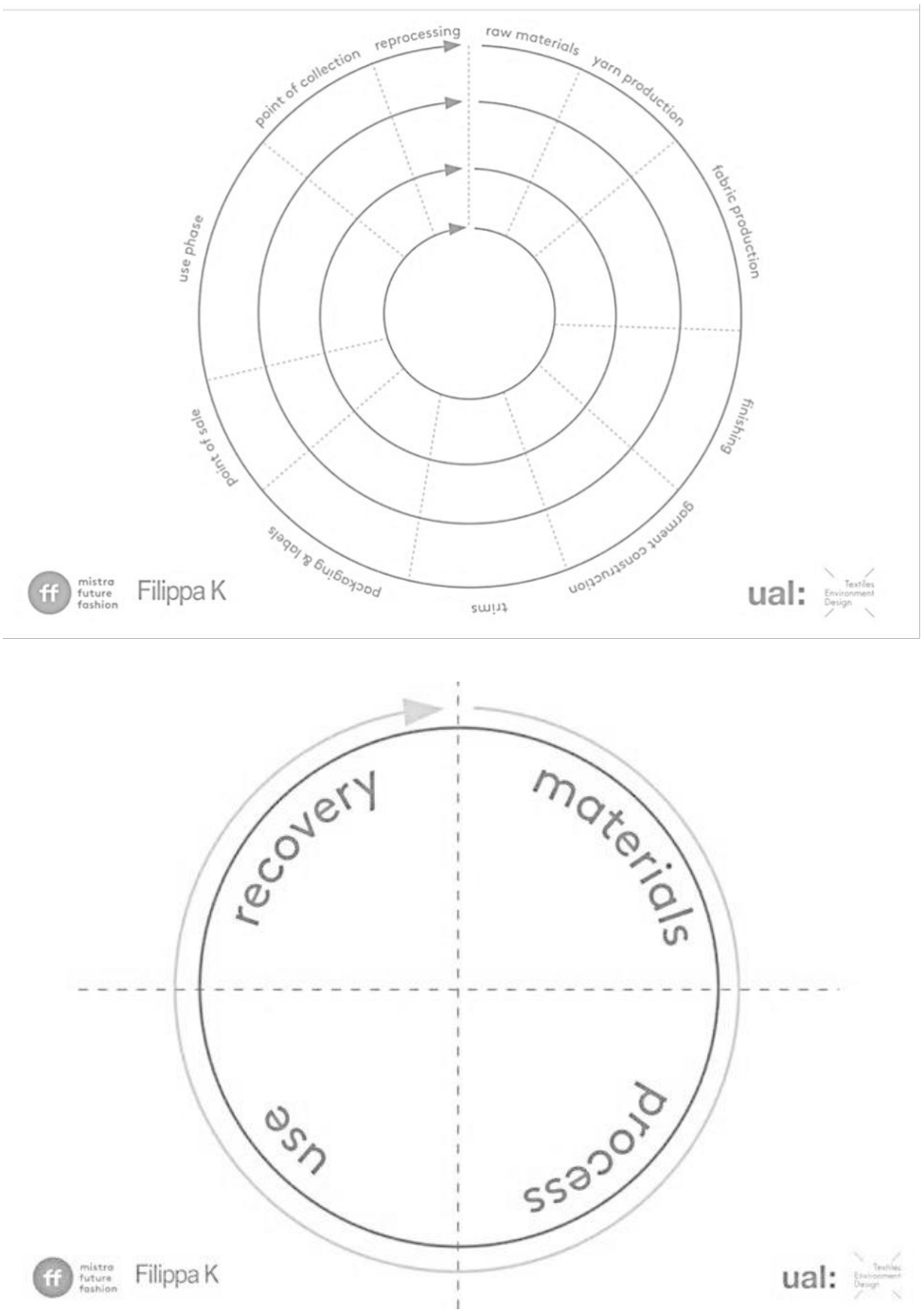


Figure 14 Top, garment lifecycle speeds redesign worksheet. Bottom, the Lifecycle Quadrant worksheet.

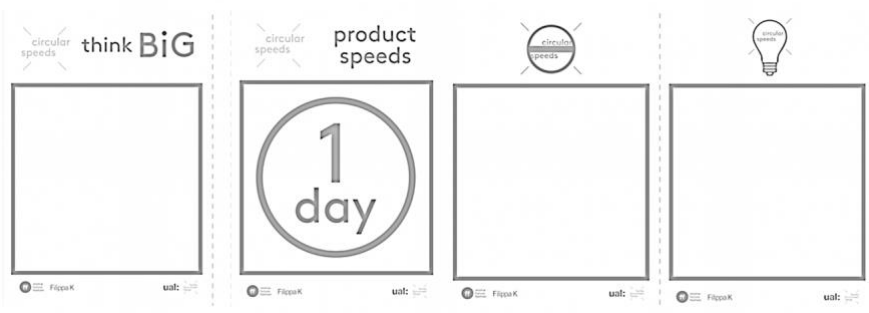


Figure 15 Workshop 2 cards.

This session enabled the FK team to understand more about the connections between global conditions and fashion textiles, and to see the potential for slow products further down the line**.** In the **'**Story Telling' session that followed the question asked was, 'What extended-life stories can we tell about clothes that last? How do the stories change as time spans change?' Using the framing of the quadrant worksheet and materials, process, use and recovery sub-headings (Figure 14, bottom), the FK team began to note the key elements that could be developed for the narrative around the slow garment. The previous sessions had stretched their thinking, but the task here was to capture the *core story* behind the garment, so that this could be used to support the design brief moving ahead. Table 12 notes the key aspects of these two narratives.

Table 12 Storytelling with the Peace Jacket (top, green) and Trench Coat (bottom, grey).

Materials	Process	Use	Recovery
PEACE JACKET Save resources Fully recyclable Old to New Durable Long-Life Materials Sustainable	Transparent Save resources Water saving Energy-saving Renewable Saving Chemicals	Reversible Unisex Transitional Multi-functional Adjustable Limited Edition Care & Guarantees Long Life Expectancy	Reward Repair Remake Extended lease
TRENCH COAT Team up with Parley Bionic Documenting collecting bottles New Life Thread International Reversible Recycled Trims Logo and Care label printed inside pocket Commercial price Recycled, durable polyester fabric, water resistant	Solar panels and Sustainability in the factory How they are collecting the bottles Educating sales staff Quiz – how many bottles make a trench coat	Long Lasting Waterproof Layering Timeless, trans-seasonal Reversible Over-sized fit Unisex	Helping clean the oceans Close the loop – no need to buy virgin anymore How much trash there already is Making polyester slow and start consuming less Sending by post and in the store Repair – upcycle - recollection

In the 'Barriers & Opportunities' session participants briefly explored what problems the FK team anticipated encountering with delivering to their design brief. The session got them to think creatively about these problems, asking the design team to consider about how 'blockages' in the innovation system at FK can be turned into creative opportunities.

DAY 2. People came in in staggered groups, to have very detailed discussions about the work from Day 1. The environmental scientist Dr. Sandra Roos attended this session to add insights from her perspective to decisions that affect the product's LCA. Two slow products were discussed (a Bomber Jacket for a woman and a Trench Coat for a man, both in recycled polyester). Throughout the day the FK team kept coming back to price and volumes; the CCD researchers offered summaries of the core ideas.

Slow Materials - The workshops had changed the way they thought of polyester: "*That came out through the training; different speeds of materials. The perception of polyester was challenged… there was a bad feeling about polyester because of microfiber shedding".* They had found some 100% recycled PET (rPET) options but the problem was price, quantity and suppliers. Good quality recycled polyester would be hard to source and the timeframe was a concern. There was a rich discussion about what makes a garment

unisex. The team discuss how to connect the two styles – the bomber and the trench – through the cut and a potential to have one jacket actually zip inside the other. There is also some discussion about what is realistic. One FK participant was very clear that this Front Runners product needed to be cheaper than previous ones. The challenge changed here from circular, and at speed, to also being more commercially competitive; a classic tension between R&D and the 'shop floor'. The participants in the room worked hard to keep finding the middle ground between what excited them, and what they believed would be achievable. The team concluded that Guppy Bags should be used with the product, to reduce the microfiber shedding that occurs during the domestic laundry process.

Fast Materials – Ideas about fast materials were discussed, so that the CCD researchers can bring the right samples on the next workshop trip. The FK team wanted to go for a natural, biodegrable material. The discussion unfolds about what is possible with the limited materials being developed within the programme (which is being used by the researchers. The Swedish wood pulp product from Innventia is in limited supply and promised to the researchers who are working on coatings and finishes, and working on these, alongside tactile perception and final LCA scores.) The conclusion is that a range of materials should be brought to the next meeting, so that more than the biodegradable paper material can be explored.

Production – What production methods can help support extending life of FK products? The discussion began with the feeling that the price point needed to be set ASAP. Production decisions are made based on this. The FK team had been looking at two options for waterproofing. A PFC-zero water repellent solution that is water-based; and Organotex or Organoclic[7]. Elin highlights that this low-impact waterproofing would need to also be offered via the Care Products range from stores. Sandra talked about the care products and the impact on the skin – applying via the washing machine is not as good as spraying the product by hand[8] (but only if users do this outside, and according to the instructions). Elin talked about the supply chain as an eco-system. Sandra mentions Spindye[9] as a possible partner.

The User – After lunch the sales team attend a meeting and target figures are discussed. The researchers explain that this session is about understanding how we can best steer and support the use of the product; how we can effectively communicate the innovation; and how we can support use habits at home. A 'short message' approach is required to help sales staff: "*super-short and easy, quick to read, so nobody feels this is too difficult for me to read. I can understand it and I can communicate it in a good way.*" The researchers recap on the design concepts discussed in the morning: "*Unisex, reversible, classic 'timeless' trench coat, possibly a multi-functional lining (a Bomber Jacket that 'twins' with it). Polyester, a hard-wearing material. Recycled and recyclable. Machine washable (with a Guppy Bag). 'Super useful' is the key message. Bring it back after you finish with it (FK can make yoga bags).*"

25% of customers are men. Concern was voiced over a unisex product being put out through the men's range. (Later on, in another session, members of the FK team are also concerned about how complex a 'twinning' item as, as there will inevitably be unsold stock as a result). The CCD researchers reminded the group that the exhibition can tell the story of what could be possible for a concept store in the future, when *"all stores are more like concept stores."* They agreed on recycled polyester being something to use now and rationalize in full in their communications, within the context of *slow and sustainable.*

7 http://organotex.com/ and http://www.organoclick.com/

8 This is because the washing machine method places the product on both the inside and the outside of the material; but the spray method just applies the product to the outside of the fabric.

9 https://spindye.com/

The researchers summarized:

- We are choosing the 'right' durable materials for the job – and they are recycled.
- We are also making it recyclable.
- Multi-function and unisex (long-life by increasing the number of wears).

The FK team added to this: "*I think one of the messages should be that 'we, at Filippa K, are helping our end consumers to be more knowledgeable about the life of material products. I can bring my jacket back. They helped me to do something good for the environment... I can leave it to Filippa K to do the right thing.'"*

Recovery – Elin is clear that the material will be rPET; this focuses the possible recovery routes. The group agrees that they have to be sure they have chosen the right material, with the information they have now, to anticipate future recycling options. Elin asks Sandra: "*is rPET the right choice?*" Sandra points out that the processing steps and dyeing is a bigger concern. The difference between fibre choices is relatively small in terms of the impacts that come from the fibre production phase. FK should look at the best processes possible for rPET: For 1 kg of crude oil used to make the fibre, 7 kg of oil is spent on the fuel for processing it and 1 kg for chemicals (e.g. dye stuffs and finishing). The researchers ask: how does this compare to cellulosics? "*We made a comparison with using spruce trees and making viscose: 1 tree to make the fibre… 14 trees to process it. So, what you can impact with the fibre choice is much less than what you can impact with the production choices.* ***Dyeing*** *is everything."*

If the energy use guides us to make the best dye choices, what choices should we make when thinking ahead to recycling? **Fiber type** is key when working for recyclability. Elin asks: "*what fibre is best, from a recycling perspective?"* The researchers answer: "*the one that's got a good route."* The room returns to discussing the benefits of wool and recycling. The FK team asks again: why would we use polyester? Sandra answers: "*because polyester is from oil; oil is not land intensive; we spend so much on fuel (not fibre production[10]); we save the 1kg of oil if we recycle it and 10% of fuel use in the recycling process."* A member of the FK team points out that we need to think about land use too: "*we need the land in the future for food, not textiles."*

Logistics and Planning – The researchers talk about the need to decide on whether a show or exhibition is possible. Could there be a pop-up concept store as the end point to this project? With workshops and experiences and happenings? Elin likes this idea very much. Also, the idea of the full visualization of the life of the materials as an animated journey showing where the user is at any given moment – a plastic bottle, a new coat, an SH product, or a yoga bag.

The FK team talked about the supply chain work that needs to happen for the two different Front Runners products. The slow supply chain seems more accessible, whereas they felt the fast supply chain will involve a lot of new partnerships.

BETWEEN THE WORKSHOPS. The timeframe was short between workshops, but the FK team worked intensely on refining their ideas. Elin wanted to get clear about the end-of-life solutions for a polyester product; whether overprinting could be a viable option as part of the slow story. Elin suggested that business development would need to be involved for supply chain development if a take-back concept like

[10] Annual global oil use: **14 billion** tonnes on fuel (BP, https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-full-report.pdf, page 8); **50 million** on polyester (The Fibre Year 2017)

this were to be developed for the slow product. There was discussion around the men's/women's products needing to be different – they were looking hard within their range to see which products would be best to base the slow products on. The FK team realised they needed the best dyeing possible for rPET, as well as the best kind of waterproofing: Spin dye and Organotex relationships were developed. Elin talked to the garment recyclers to get some garment and material guidelines.

WORKSHOP 2 SUMMARY. This workshop asked participants to think about:

- What materials are 'past', 'present' and 'future'?
- What materials are seen as 'slow' and 'fast' for the company?
- What qualities are we looking for from 'slow' and 'fast' materials?
- What ideas do we have for the new FK 'slow' garment concept? What new ideas do we get when we use the lifecycle diagram?
- Case study talk: What other ideas – like overprinting - are out there that can be built into the FK 'slow' garment?
- What future global scenarios could affect the way we design fashion?
- What extended-life stories can we tell about clothes that last? How do the stories change as time spans change?
- What barriers will the FK team encounter in achieving this design brief; how can these be seen as creative opportunities?

>> This workshop resulted in the participants fully exploring their two slow product concepts – a Bomber Jacket for a woman and a Trench Coat for a man, both in recycled polyester. New ideas and a greater understanding gained - around materials, pricing, production, the relationship with the user and recovery processes.

5.3 Workshop 3 Results: 7 - 8 June 2017

DAY 1. The day began with a presentation of the survey results from workshop 2. Participants clearly saw the benefits of early-stage lifecycle thinking, and having the opportunity to consider how this relates to Filippa K brand strategies and design approaches. Designers were also keen to point out the challenges, such as the technological and logistical lag in sophisticated textiles recycling methods. Next the team reported on what they have been doing since the previous workshop, with Elin Larsson describing the input they had received from a range of FK employees during a cross-departmental meeting to discuss the 'slow Front Runner'. FK developed criteria for two ideas including a polyester raincoat, which was a different material direction for the company.

Dr. Kate Goldsworthy then reported on the short life materials research conducted at CCD, stating that there was a need to challenge perceptions of what fast materials can be, given that our key goal with circular design is to retain resources. Research case study presentations were also given by Dr. Hjalmar Granberg and Professor Kay Politowicz, considering paper innovations as a fast and light material for ultra-fast textiles. Hjalmar provided tactile materials samples to fuel the discussion and provide a reference point during the day. Dr. Sandra Roos then used her LCA expertise to 'myth-bust', challenging misconceptions about lifecycle impacts and providing participants with another layer of information to guide their design decisions.

The first design session saw the participants divided into six groups to develop and explore short life scenarios (figure 14) using the familiar lifecycle worksheets, before giving an elevator pitch in session 2.

Each of the six fast concepts were then discussed and a vote was made. The **Other Me Dress** and **Crisp T-shirt** were the clear favorites, representing different user experiences, materials challenges and service models. The session ended on an enthusiastic note about the two fast concepts coming from the User exercise from workshop 1 day 1 – the Joseph T-Shirt and the Kenzo Dress. However, the mindset of the designers was still questioning the idea of fast materials: *Are we really using polyester? Do we have to?* Elin decided to open the sessions up to anyone who wanted to come, which was seen as an interesting step forward.

Figure 14 Workshop 3. Fast Garment Cards.

DAY 2. Following a review of the previous workshops, the CCD researchers decided to make the marketing session a priority as it had been so pivotal during the last workshop. Discussions revolved around the two concepts chosen the previous day; the **Other Me Dress** (special occasion wow) **and Crisp T-shirt** (super-fast disposable). The two garments were at the different ends of this fast spectrum. FK researchers reflected on why a non-woven material 'makes sense', given the insights from Dr. Sandra Roos about the impacts that come from processing: "i*t's still really tricky to explain why we think people can have fast consumption… Sandra's presentation was really mind-blowing. We all think the impacts are in the fibre choice. We want to make it for the paper recycling or domestic composting… This is easier to grasp than last time."*

The second session looked at materials and recovery. Regarding the t-shirt they considered that the material had to be exactly right. Having given a brief to the material researcher (Hjalmar), the FK team discussed weights and trade-offs with stiffness, and ways to achieve stretchy ribbed-like trimmings. For the dress, the designers considered a chiffon-like textile and discussed whether Emma Watson would wear it on the red carpet. Using soy colors, bacteria dyes, to change the dress over time. The participants also felt that feedback from LCA expert Sandra on the comparative impacts of the products would be beneficial at this stage. The cost of the garments was also a point of discussion again in this session; balancing the cost of development with the price people would pay for a non-durable product which isn't designed for second use.

In session 3, production and logistics were considered in more depth. The CCD researchers asked: What will the production systems be for the fast concepts and how will we need to develop this? All participants agreed that the material is the key, it has to be right before it can go any further, which shows the change in the design mindset towards a materials and circularity-first approach. The group discussed various topics: material challenges, fiber types and cut, consumer habits, thinking again – experimenting with materials and design in the studio, is it possible in paper; how do we assemble it?

A social media response to the morning's press conference created a final interesting discussion: a claim that short life fashion will never be able to be justified. The team considered that they are looking to see if they can improve something that is a user behaviour issue; could they do it through material and product design, or can it only be done through behaviour change? Could they do both? Should they try to change behaviour? Finally, the group looked at the business models that would be needed for these fast concepts.

BETWEEN THE WORKSHOPS. With some more concrete concepts to progress with, several focused steps could be taken by both teams following the workshop. Elin's role was to drive the concept forward with input from management and womenswear designers, while CCD had more focused materials research to conduct in collaboration with RISE, to produce and present materials samples to FK related to the dress concept. LCA partners could now be briefed on the data that they might need to assess the concept.

WORKSHOP 3 SUMMARY. This workshop asked participants to think about:

- What materials are available for 'fast and light' circular fashion?
- How can we challenge misconceptions about the lifecycle impacts of materials?
- How can we use fast garment scenarios to develop ideas for the FK fast product?
- What will the production systems be for the fast concepts and how will we need to develop these?
- To what extent can the product be designed with consideration to user behaviour change?

>> This workshop resulted in the participants exploring fast and circular product concepts, and voting the six ideas down to the two strongest to develop more after the workshop - the *Other Me Dress* (special occasion wow) and *Crisp T-shirt* (super-fast disposable).

5.4 Workshop 4 Results: 22–23 March 2018

DAY 1, PART 1. The first session of workshop 4 was as usual a chance to review what had been happening since the last visit. Workshop 3 had been several months previous, so there had been quite a bit of progress on the design concepts, both with UAL and FK. This was a chance to share; Where are we now? What have we already learned? What have we achieved? What has not been covered? What have the FK & UAL design teams been working on, and what are their latest insights? What else has been happening (globally) since we last met and what does this mean for us? In particular we focused on the progress of the Design / LCA collaborative tasks which we had been working on over the last 6 months. In order to communicate our concept to the LCA team we had adapted our concepts as a flowchart of lifecycle stages, against which the concepts could be assessed.

DAY 1, PART 2. The main aim of this session was to map the fast and slow Front Runner concepts as fully as possible in preparation for Sandra's review session the following day. By using some familiar tools from our previous workshops we focused on telling the stories from a lifecycle perspective, ready to apply LCA Data as the next step. We mapped the Front Runners garments into our circular speeds framework (to do this

we took each product in turn and put down everything we 'knew' about its journey as well as noting what we don't know (or control). We knew almost everything about its production and processing by this stage, and its design and recycling potential. But what stakeholder actions or user behaviour might we need for the garment to live up to its potential?

Each concept was mapped as a linear journey on a long roll of paper. Ultimately the aim was to define the key LCA 'wins' (stories) for each concept and to propose further developments if needed. For each garment the aim was to end up with a list of recommendations for the next steps and for LCA focused 'storytelling'. We divided each session into two. The first focusing on building a lifecycle journey map based on everything we knew so far. Differentiating between 'fixed elements' and 'flexible' ones. We began to identify questions for clarification in the session with Sandra. The second part continued the lifecycle mapping with further discussion around hotspots and decision points. Where might the biggest LCA win be for each concept? The result was a complete journey map with defined hotspots, decision points and questions for LCA input.

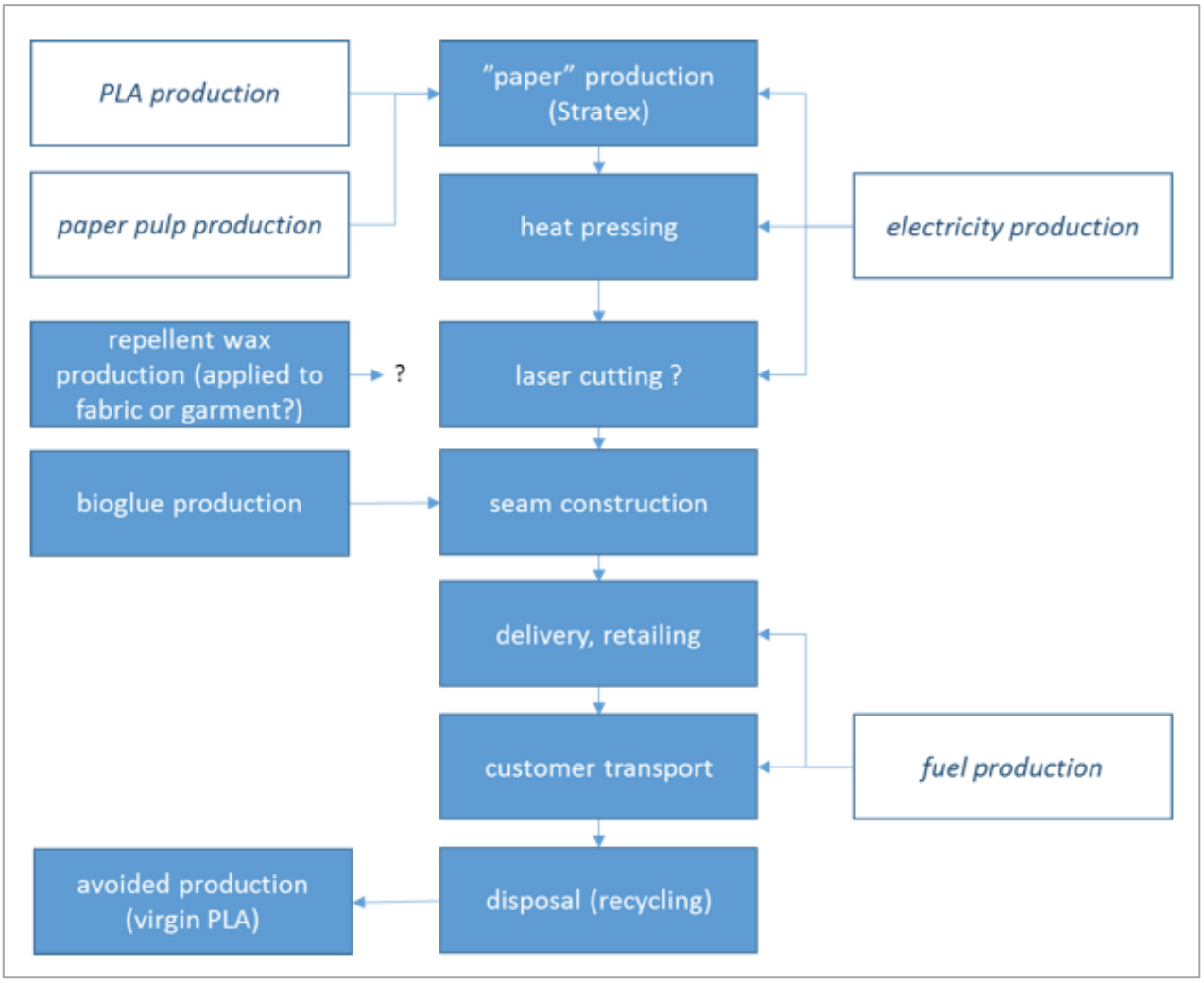


Figure 15 Slide taken from the CCD researchers' presentation which showed how LCA building blocks were being constructed to create a lifecycle assessment calculation for the fast prototype

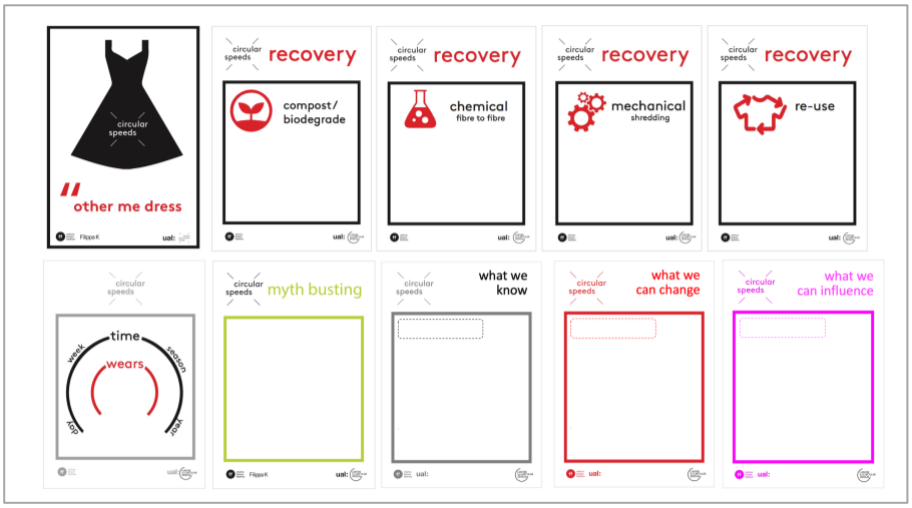


Figure 16 Tools used to review and analyze the developing concepts during the workshop.

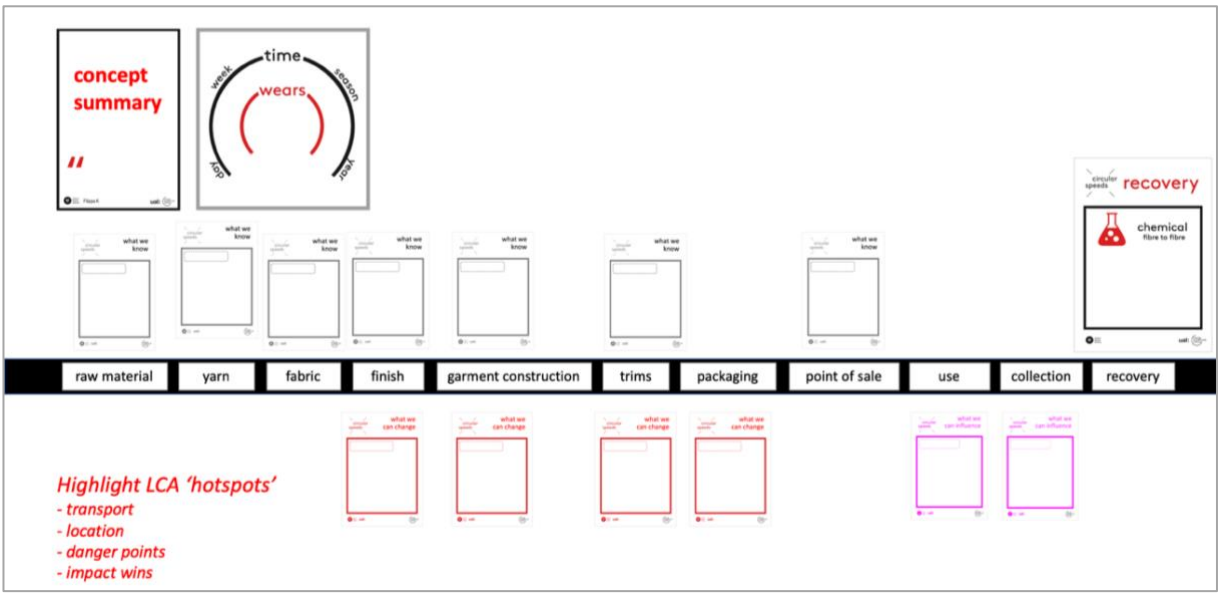


Figure 17 The layout of the worksheets with suggested placement of tools.

Figure 18 Building the lifecycle journey maps with the FK team.

DAY 2, PART 1. This began with a discussion about the potential exhibition during the launch in November 2018 – as some of the MFF team had to leave. We asked, 'what is the overall story we want to tell, combining FK and UAL? How does the MFF communications team see the opportunities to disseminate? What about the UAL's REF requirements, their budget and timings? How will we launch the work / show it in public? What is the communication strategy?' Some of the FK team were worried about this showcasing part of the project: "*I remember feeling quite confused about the exhibition, how to manage it. It was outside of my scope a little bit too…."* There were also some reflections on the name, *Throwaway Dress* – was it the right name for the overall message? (The CCD researchers argued that the use of language was key for designers and the user to consider their wardrobe speeds more consciously; they didn't feel that the name reflected the considered thinking well enough.)

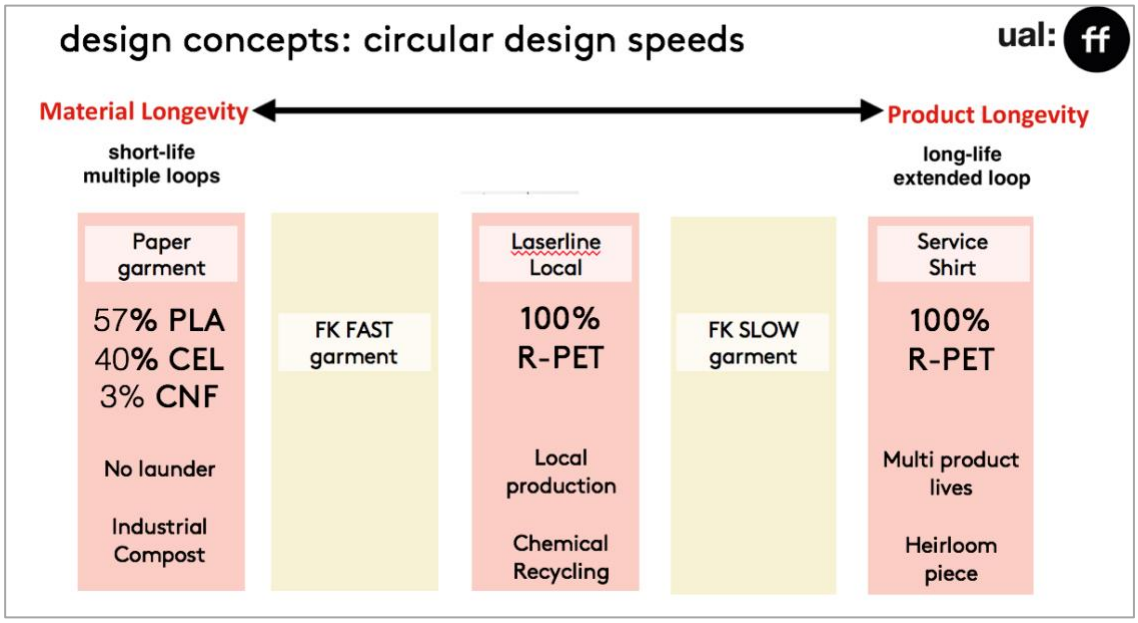


Figure 19 Mapping our concepts side-by-side.

DAY 2, PART 2. The focus of the final session was to review the concept maps we had produced on day 1 with environmental scientist Sandra Roos in order to validate decisions made or point to further research or adjustments which might be needed. To have such input as an integrated part of the design process was revelatory and a new experience for all around the table (figure 20). We worked through each concept map section by section and added in Sandra's questions, insights and tasks to the map as we went.

This activity both built on the previous day's worksheet with additional LCA input, and also highlighted a series of further action points to confirm the LCA story for communication. We had taken the hand-drawn worksheets from day 1 and compiled a table for each concept with the key discussion points for Sandra. As the meeting progressed these tables were updated with further questions and reflections and shared with the teams for further reflections post workshop.

The fast concept - '*The Throwaway Dress')* – had the following main features; that it would be designed as short-life 'occasion wear', a *"provocation piece rather than a commercial development"* bringing awareness of the different speeds present in every wardrobe and the potential for change. All agreed it was an unusual departure for the FK brand and *"not very FK".* However, with the 100% bio-based and

compostable material properties they were happy with the LCA potential for the garment and had decided to make three concept dresses as final outcomes.

Figure 20 The LCA workshop to review the mapped concepts – input and discussion lead by Dr. Sandra Roos.

The slow concept was called *'The rPET Jacket'* (eventually to be renamed as *'The Eternal Trench Coat'*). This was a much easier fit for the FK brand. A long-life wardrobe staple, made from 100% recycled and recyclable materials. Design for recyclability was highlighted as a key feature to be achieved, and towards this aim they had partnered with industrial recyclers Woolkat[11] who were providing a structure for the design brief based on their take-back requirements. At this stage FK were working on three outerwear styles: a men's and women's sports jacket, and a women's trench coat. The big change in this concept was FK's acceptance of RPET as a potentially 'slow' material.

DAY 2, PART 3. The final part of the day included a 60-minute round table discussion to review the key insights from the two days. Where were the main LCA stories and how did they sit together? What other FK activity might they enable? Are there any conflicts between the two? To what extent should the UAL concepts refer to the FK concepts (and vice versa)? We also discussed the project as a whole, looking back over the conditions as they had changed over the course of the CDRR project. There had been changes within the front runners' team, Emilia, who had taken on the challenge of designing the fast FK concept, commented, *"People who got on board didn't necessarily have the background. That was perhaps a bit disjointed."* At the very end we consolidated our actions for follow up and agreed next steps towards our joint exhibition in the Autumn. At this point in the project everyone was tired but excited that we had managed to achieve so much within the project.

[11] Woolkat, https://www.wolkat.com/

WORKSHOP 4 SUMMARY. In this final workshop the concepts were reviewed in terms of their lifecycle impacts and the decisions that had been made, or were still pending:

- What do we know? (what parts of the design or material cycle are fixed and fully known)?
- What can still be changed? (where in the product journey is there scope to change the design or supply chain in order to achieve a better LCA profile)?
- Where are the clear LCA wins? (which part of the lifecycle story represents the best opportunity for LCA wins)?
- Where are the hot spots or danger points? (where can we identify incomplete knowledge or uncertainty in the cycle)?
- What are the crucial questions and decisions to be made following the workshop?
- What are the 'narratives'? (define the key LCA stories for each concept as a summary text).
- How can we make the final decisions about naming, showing and sharing the work?

>> This fourth and final workshop focused on refining the lifecycle assessment stories for the FK slow and fast prototypes; to give a clear picture of the now, near and far slow and fast narratives developed and their circular design speed profiles.

6 reflections, insights & recommendations

The final prototypes, presented at the London showcase event in November 2018, marked the end of the CDRR project and is discussed in this section, along with the key insights from the overall process. Recommendations are made in section 6.4 to help others use these workshops approaches themselves – regularly bringing together academics and experts into a brand context towards the creation of circular products with different lifecycle speeds. The final results show that interdisciplinary projects – whilst not necessarily being simple in planning or execution - are able to produce a richness of insights that benefit a broad group of stakeholders. Feedback from the CDRR project, collected from interviews with three key FK participants which took place in Stockholm in April 2019, is used throughout this final section of the report.

6.1 The Fast and Slow Prototypes

For the CDS project at Filippa K the CCD researchers devised workshops to support their innovation process, towards the creation of two new Front Runners garments – the latest additions to their ongoing sustainable fashion collections (Figure 21). In parallel to this process, the academic researchers developed their own, more 'blue-sky thinking' prototypes back in London. Both sets of prototypes responded to the challenge of making circular – recycled and recyclable – fashion products that had varying lifecycle speeds[12].

> *"I think it was really cool to have academic researchers leading us and challenging us and I think I would like to keep that somehow. You don't often get that in a supplier, design/product development. [Need to consider] how to do it in a more seamless way as you can't always take time out for these big workshops. I think it was also interesting to have input early on from cross-functional roles. It gets messy with lots of people designing, but it brings out interesting ideas."*

[12] To read about the prototypes in more depth, please refer to the full report, '**Circular Design Speeds:** Prototyping Fast and Slow Sustainable Fashion Concepts Through Interdisciplinary Design Research (2015-2018)' (Goldsworthy, Earley & Politowicz 2019).

Figure 21 The fast and slow FK garments.

6.2 The London Showcase

Throughout the CDRR project the researchers had encouraged regular day 2 discussions about showing the results in public. Restricted by budget, and the resources to seek sponsorship that would support a larger exhibition, the core team at FK and at Mistra Future Fashion had decided on showing the work in London, using the CCD researcher's campus space at Chelsea College of Arts, University of the Arts London.

The events took over two room of the Banqueting Suite, a grand Edwardian space used for special events. One room was set up for a breakfast press conference and an afternoon public research symposium; the other space was set up to host the exhibits, with guided tours (Figure 22). This space stayed open for three days, receiving visitors from across the UK. The exhibition was advertised on CCD's social media accounts, and got front page coverage in an Eco Textile News bulletin[13], which boosted visitor numbers over the weekend. The CCD researchers were on site for the duration to give guided tours, and met up with many industry experts and academics who had come to find out more about fast and slow circular design.

How did the London show experience feel for the FK team? *"I felt like it came together in a clear linear way. That felt really good. I felt really good about how it was displayed… Doing tours was really good because it showed how it flowed… We were so happy that we [the exhibition] got so much press."* Feedback was also really positive in terms of having more of the FK team involved in these events – a group travelled over for the set up and press launch. The interests broadened beyond the Front Runners team to include more staff from the company, and sparked more conversations about sustainability in general: *"Everyone got excited about sustainability and mindful consumption."*

[13] https://www.ecotextile.com/2018112323877/shows-events/exhibition-explores-fast-and-slow-fashion-innovation.html?acm=_153

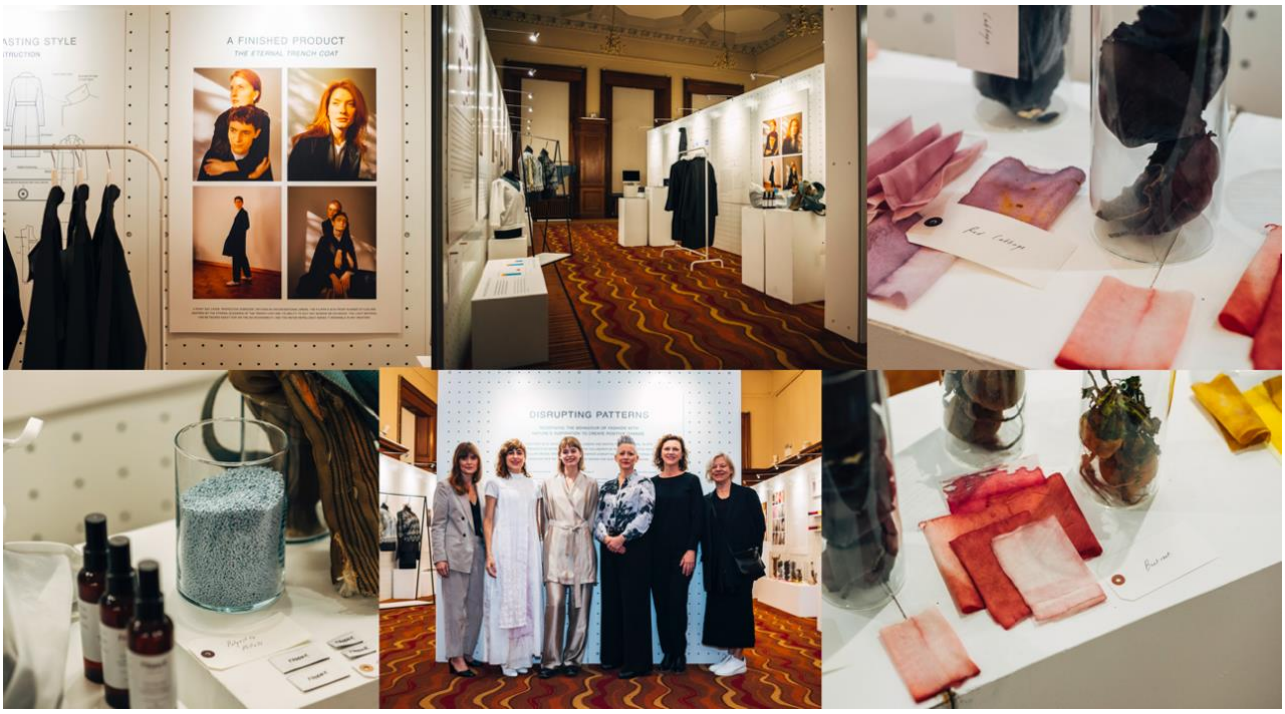


Figure 22 Disrupting Patterns Showcase, London 23-25 November 2018.

6.3 Insights

The Circular Design Researchers in Residence project produced strong results for both parties – the CCD researchers and the FK Front Runners team – and the section below shows where things worked well but could also be improved upon. Overall, the managing of expectations can never be underrated, nor the on-going communication between the different stakeholders in a project like this. There needs to be an ongoing process of noting of the different things each partner is trying to resolve, so that tensions and pressures are understood and the project teams can support each other more. Also, the more time partners are able to put into co-planning and reviewing the process, the stronger the final model will be. Also, an on-going consideration should be made for the assumptions we all make around language and words overall – from *fast* and *slow*, to *synthetic* and *natural* – we need to avoid making implications around polarity, when blends and spectrums are in fact the reality. The following insights are divided into themes of participation, timing and workshops.

6.3.1 Participation

- **Designing the Culture.** Reflecting on Front Runner set-up at the outset, Elin commented. *"What I think was quite unique with FK was the Front Runner set up, which meant that you had this space to be creative; to be innovative…to work outside the regular boundaries."*
- **Energetic Engagement**. Important to find creative ways to keep people energized and receptive; mix of informative, creative, story-telling, tactile and visual approaches. This was done well in the project.
- **Participants**. The whole team needs to be present. New staff need to be more integrated into the project as they join in. There is always more that can be done to make people feel part of the process, and to improve on the circulation and recirculation of knowledge.
- **Head-Hunting.** Important to locate your research-ready employees, and those that want to bridge-build from industry to academia and research. Some are readier than others to expend this energy and think differently – often it takes up extra 'headspace' on top of a busy job.

6.3.2 Timing

- **Aligning Timelines.** *"We have different speeds in academia and in business, and it's quite difficult to get these speeds to join forces."*
- **Space Between.** We learned how crucial the essential gaps in between workshop trips were. More could be done to craft and capture the learning from these time periods.
- **Rapid Response.** What happens immediately after each workshop is key. More summaries and recap sessions with the teams and individuals, to ensure people have really understood what happened at each session. Filling out the surveys – such an important process for the researchers to gain feedback - should be done in the room, at the end of each day, to ensure better response rates.
- **Parallel Innovation.** The best way to support innovation is to be innovating yourself. Two parallel journeys, with problems and insights shared along the way, is a rich way to work. This can produce fundamental, applied and commercially available research and innovation through the same project.

6.3.3 Workshops

Tools

- **Common tools**. Use the same tools wherever possible throughout the project. Leave the tools with the teams to use themselves; encourage and support their use.
- **Material samples.** Do more with the materials. They are the glue that holds everyone together, through the shared passion for textiles.
- **Play and humor.** The bringing of one's own clothes to a session and the speeding tickets elements proved popular – because they were playful and thought provoking. The ideas created in these sessions stuck in the memory of the participants and got integrated more into the product development work that came later.

Workshop 1: Meet & Map

- **Ensuring Buy-In.** The first workshop is very important for building a sense of team and commitment. Tasks here can be more social, fun and playful.
- **Managing Expectations.** All participants need to leave workshop 1 understanding not just the shared vision, but how this will be achieved. Important to discuss the what will and won't happen aspects of a project at this first workshop.
- **Reviewing Timeframes**. The timelines need examining during day 2 of this trip – to ensure that the academic and industry work patterns can align towards a common end point.
- **Spectrum of Speeds.** This first workshop needs to explore extremes of speeds – the fastest and the slowest clothing possible

Workshop 2: Thinking Slow

- **Materials and Process.** These discussions should be held together; there were so many overlaps and knock-on effects.
- **Expertise in the Room.** Having the environmental scientist there made a huge difference to the day 2 discussions – the mix of design researchers with science researchers worked well. Need new tools for this kind of work.
- **Push and Pull.** Getting the balance right between the research and commercial ideas is an ongoing challenge in a project like this. The fact that we were working towards an exhibition outcome, as well as the launch of a commercial product, helped here.

Workshop 3: Thinking Fast

- **Early Data.** There were reservations regarding fast relating to lack of data to back up this product concept. *"To be honest we were not sure whether the fast product would be more sustainable or*

not. On the other hand, now that the research is out there you can make more conscious decisions in your designing and product development phase."

- **Context is Key.** The ideas discussed around fast were really very rich. Accepting that the user is a human with an enormous range of diverse needs means that we could be making clothes for more versatile wardrobe use in the future.
- **Fast can be both natural and synthetic.** The FK team wanted to create a fast product for the natural cycle, to spread the experience across the material groups; but many ideas in the workshops showed that polyester can be used to create fast loops of use within the slow loop of the material longevity.

Workshop 4: Thinking Fast & Slow (LCA)

- **The benefit of familiar tools.** By the final workshop the whole team were well versed in using the tools. This repetitive use enabled a confidence in the final session which was beneficial to all.
- **Thinking now, near and far.** It was important to note which ideas were flexible and adaptable for the first iteration and which ideas, whilst valid, might have to wait for another time.
- **Keeping expertise in the room.** Having the LCA discussions at every stage in the project was invaluable. Even at this late stage there was still flexibility in the detail and improvements to be made. A collaborative rather than an audit process.
- **Reviewing expectations to the end**. It was surprising how many assumptions were still being made at this final stage of review. Simply asking for everyone's expectations again at this point was revelatory.

6.4 Recommendations

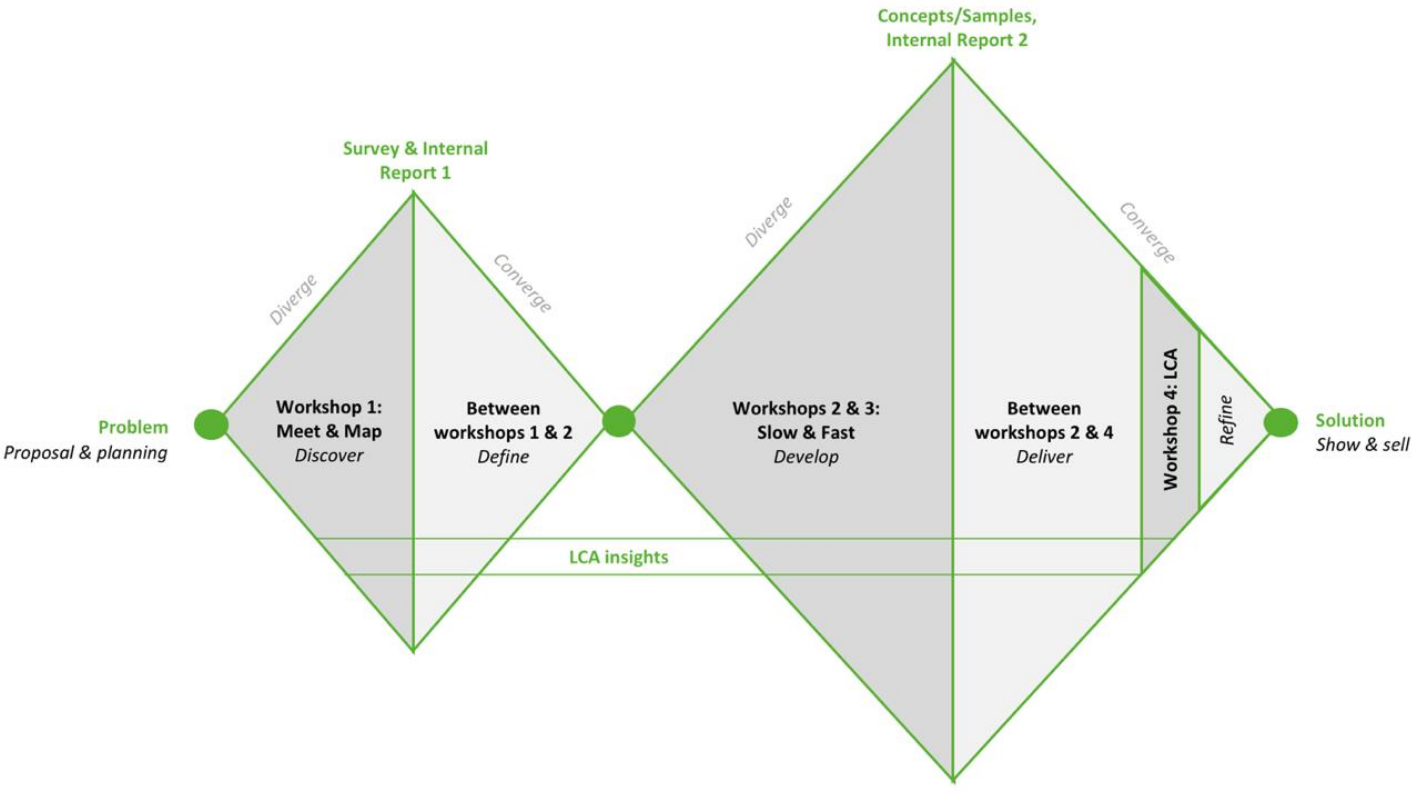


Figure 23 Circular Design Researchers in Residence workshops model

This revised CDRR project model, figure 23, reflects the actual way we worked together. The double diamond shape, based on the Design Council's innovation model (2004), has been redrawn to recognize moments where the process needs milestones, as well as ways to support the teams more and integrate ongoing inputs, like the LCA expertise.

The first diamond is smaller and is given over to the whole of the Meet and Map experience of workshop 1. This first workshop introduces concepts, questions and frameworks that in the end, constituted a whole journey of its own. So many of the comments and ideas from this first workshop were drivers for the rest of the project. The idea behind giving it its own diamond shape is to encourage researchers to go into a company and really shake things up at the beginning of a project.

The second diamond begins then with the development work of both the slow and fast concepts, with the divergent phase being the long period between workshop 3 and 4 where the brand made their prototypes real. Workshop 4 comes at the end of the convergent, refining period, where the LCA tools are used to produce the final accounts for the new circular products. Several milestone moments are marked in the model – the launch of the project, the surveys and internal reports and the showcase 'show & tell' moments all featured in the revised model. For a brand or institution wishing to use this model, we also recommend you consider the following aspects:

- **SET YOUR ENTRY LEVEL.** For companies at the very beginning of their sustainability journey the internal work might start with some of the other tools first to get the culture ready for the complex challenges that circular design and speed can bring (Table 3; page 18). This would give you the opportunity to build your team and gain a shared set of values before exploring the broader contexts of sustainability (which are important but are not necessarily essential to achieving circular products).

- **INTEGRATING EXPERTISE.** If you are a company already working with sustainability, but you want to close your loop, a more advanced, better resourced version of the CDS programme would have LCA and material innovation experts in residence at the company as well as academic design researchers. They would conduct pre-studies to develop related data and tools, and then be in a position to support the innovation process as it unfolds.

- **SHARING THE RESULTS.** If you are a design researcher wishing to work more closely with commercial companies towards the circular economy, it's important to spend some time aligning the objectives of both the institute and the company or organization you are working with. Academics are obliged to publish work in quite particular ways – you need to agree in advance about how this will work alongside commercial confidentiality.

Finally, it would be appropriate to end this report on a last note about the social nature of working this way, an impact which reached far beyond the new circular products we made. The interviews showed clearly that for the staff at the brand, the experience of collaborating, questioning and thinking outside of the day-to-day business infrastructure, supported by the academic team, led to new energy and drive for change. This commitment was made concrete because the project involved making real products, and not just exploring theory. This report has attempted to reflect this project journey through the details of the design decision-making we encountered at every turn. We hope you find it useful for your own circular design journeys.

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MISTRA
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About Mistra Future Fashion

Mistra Future Fashion is a cross-disciplinary research program, initiated and primarily funded by Mistra. It holds a total budget of SEK 110 millions and stretches over 8 years, from 2011 to 2019. It is hosted by SP Technical Research Institute of Sweden in collaboration with 11 research partners, and involves more than 30 industry partners.