

# Industry Living Labs

A series of workshops to co-develop streamlined DPP processes that reduce complexity and increase accessibility

## Workshop #2

2 March 2026 (New Order of Fashion, Eindhoven)

- **Dr. ir. Troy Nachtigall** – Lector Fashion Technology, Hogeschool van Amsterdam, Faculteit Digitale Media en Creatieve Industrie | CoE Creative Innovation
- **Dr. Christof Francke** – Lector Biobased Innovations, HAN University of Applied Sciences | CoE HAN BioCentre
- **Dr. Pascal Wiggers** – Lector Responsible IT, Hogeschool van Amsterdam
- **Douwe van der Leest** – Lector Bioinformatics | HAN
- **Tilman Todt** – Project Leader Applied Data Science | HAN
- **Dr. Marcio Fückner** – Senior Researcher Responsible IT, Hogeschool van Amsterdam, Faculteit Digitale Media en Creatieve Industrie | CoE Applied AI
- **Martijn de Bruin** – Researcher Responsible IT & AI | MSc Artificial Intelligence, Hogeschool van Amsterdam
- **Mijke van Ballegooijen & Robert Pans** – CEO, and Finance Controller, BYBORRE
- **Ellen Albers & Haiko Huvenaars** – Initiator and Chairwoman, and Director New Order of Fashion
- **Lex Raijmakers** – Co-Founder Candour.Digital
- **Thijs Verhaar & Tonka Oštrić** – CEO, and Microfactory Production Technician, KNITWEAR LAB
- **Claire Teurlings** – Ketenregisseur Circulair Textiel, Textielregie
- **Francesco Sollitto** – Research Analyst in Data and Sustainability, Hogeschool van Amsterdam
- **Marco Mossinkoff** – Senior Researcher in Textile Value Chain, Hogeschool van Amsterdam
- **Lyske Gais de Bildt** – Researcher, Hogeschool van Amsterdam

# Agenda

- 01** Welcome & Introduction to Workshop 2 (Troy)

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- 02** White paper presentation: ecosystem analysis (Francesco)

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- 03** Recap / Results from the first workshop (Lyske)

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- 04** Summary of Interviews held by NOoF (Mila)

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- Break

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- 05** Intro M-DPP (Tilman)

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- 06** Participatory Part:  
Mapping wants and needs using the Loopholes stakeholder canvas

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- 07** Outro and Findings (Troy)

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*CREATING MORE sustainable AND innovative TCLF INDUSTRIES WITH THRIVING SKILLED PEOPLE*

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01

# Welcome & Introduction



# Digital Product Passport (DPP)



Tracking of **raw materials extraction/production**, supporting due diligence efforts



Benefit **market surveillance authorities and customs authorities**, by making available information they would need to carry out their tasks



Enable **manufacturers** to create products **digital twins**, embedding all the information required



Make available to **public authorities and policy makers** reliable information. Enable to link **incentives** to **sustainability performance**



Tracking the life story of a product, enabling services related to its **remanufacturing, reparability, re-use/re-sale/second-life, recyclability**, new business models



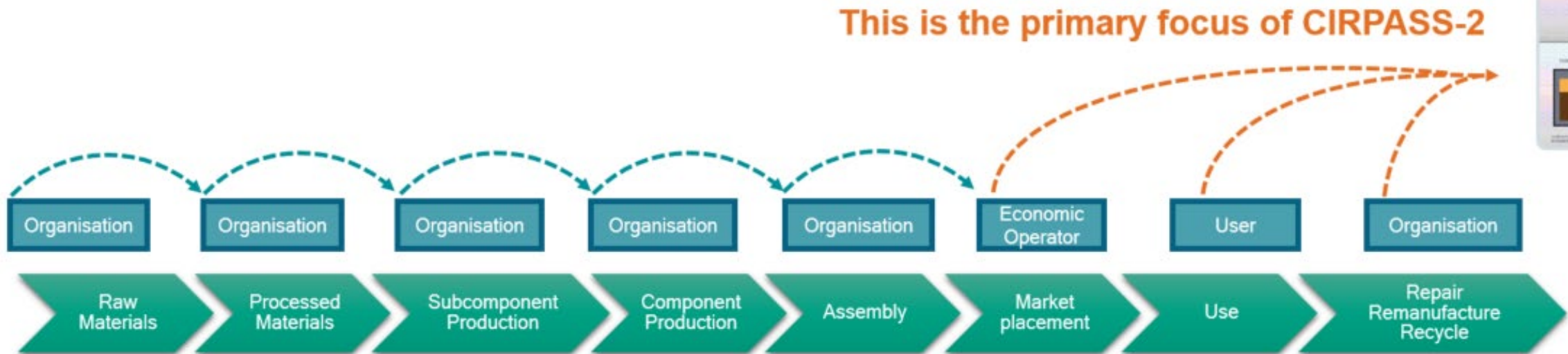
Allow **citizens** to have access to **relevant and verified information** related to the characteristics of the products they own or are considering to buy/rent (e.g. using apps able to read the identifier)



# What problem are we trying to solve?

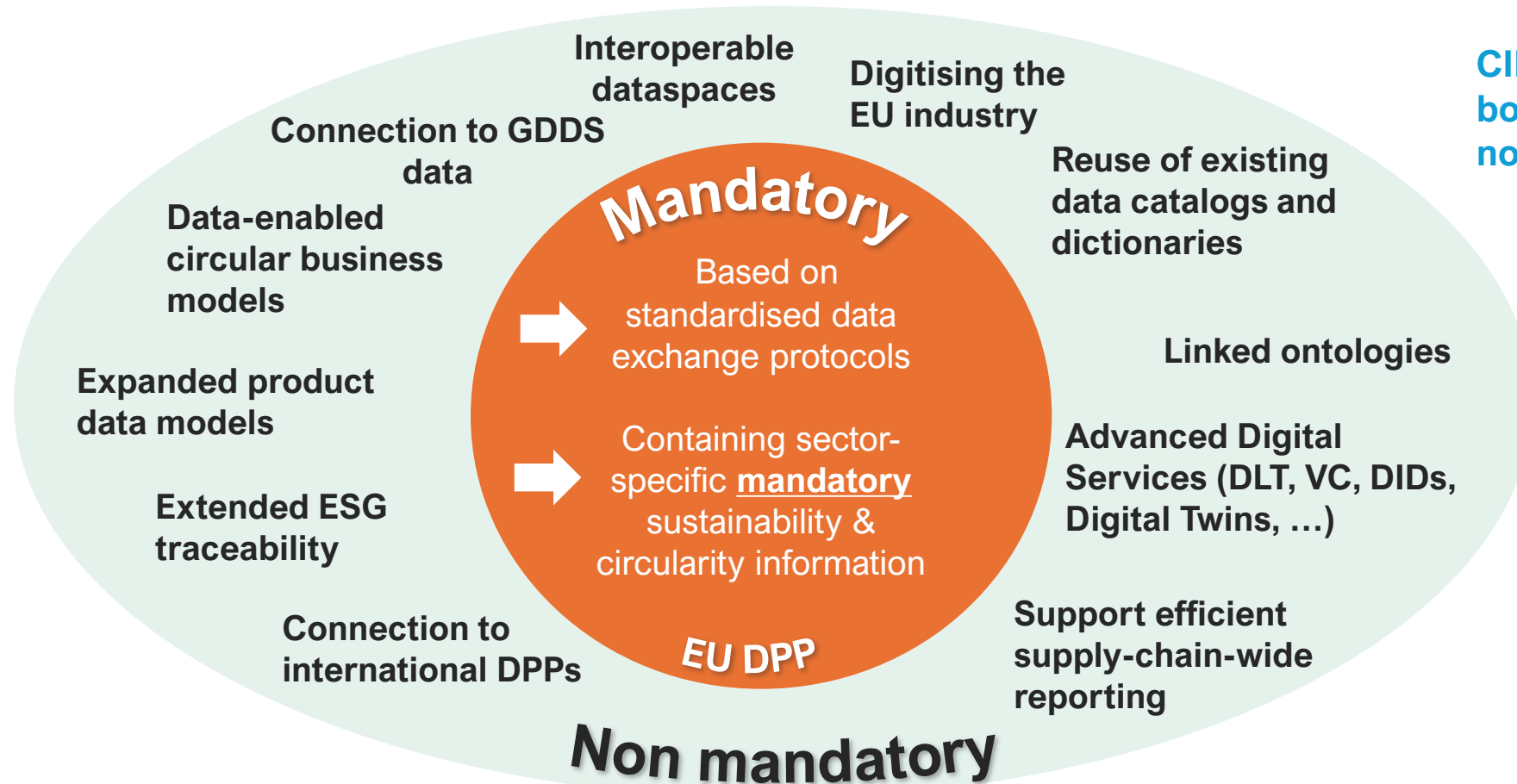
- **Problem statement:**

- How can **all industrial sectors** agree on a common DPP system that is:
  - compliant to the regulatory requirements,
  - capable of supporting the massive issuing of DPPs in 2027,
  - is extensible and flexible to support beyond-mandatory data exchanges to enable new circular business models?”



# Why is the DPP System an incredible opportunity?

- **Vision:** The DPP links the EU internal market to the data economy.



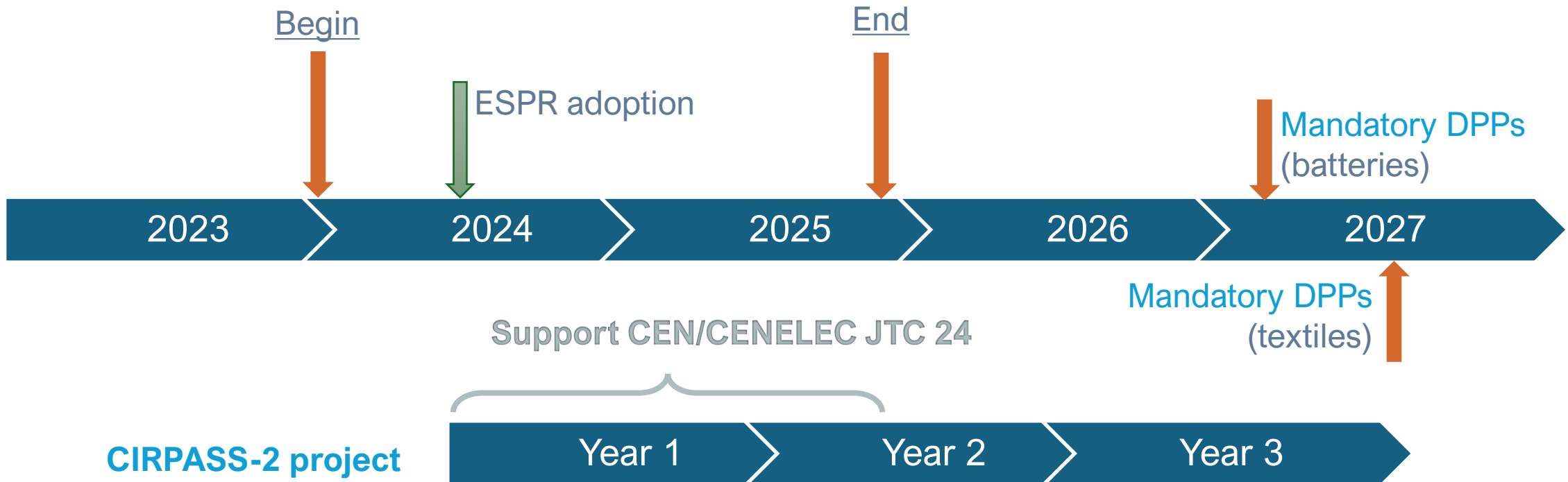
CIRPASS-2 addresses both mandatory and non-mandatory DPPs



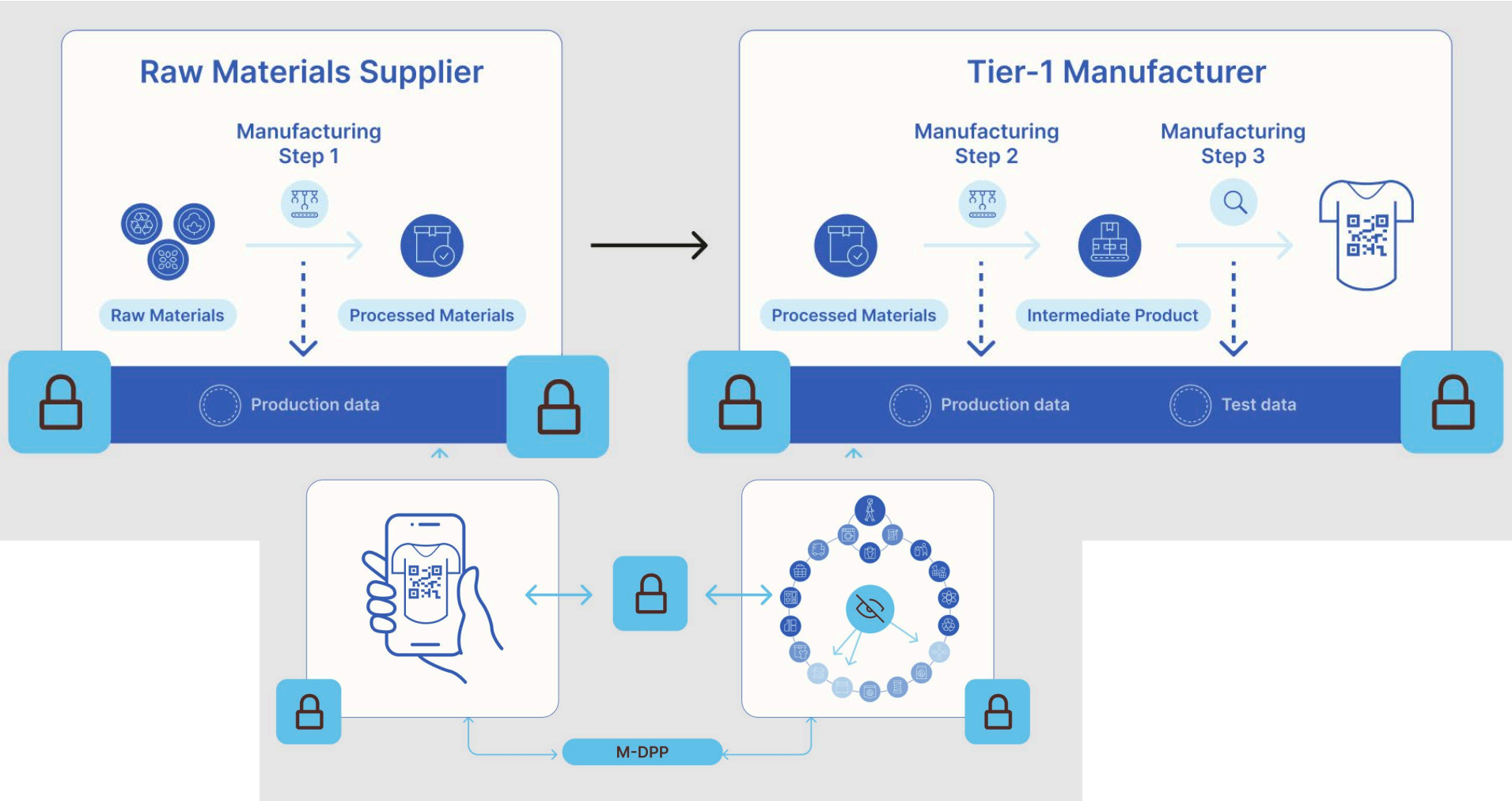
# DPP System Standardisation - Timeline



Standardisation Request – DPP System standards CEN/CENELEC JTC-24



# Data Spaces



# COMMON EU framework

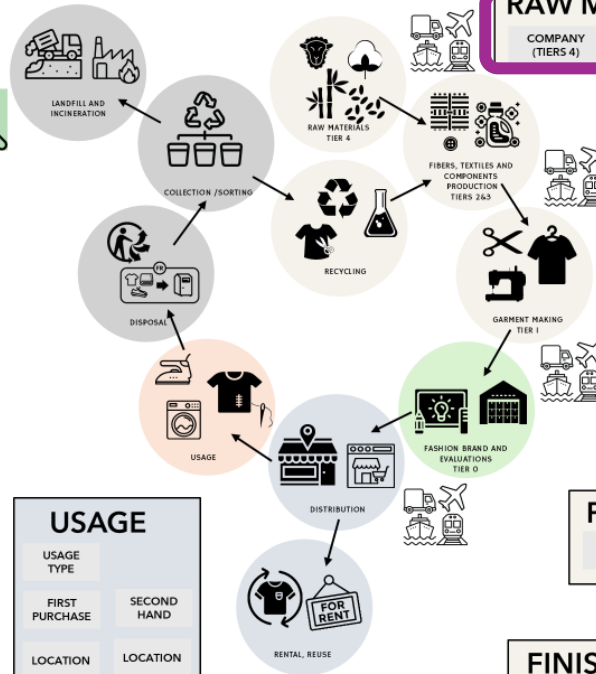
Tracing data back to Tier 0 is one of the biggest challenges in DPP implementation

RECYCLING		REFERENCE	IDENTIFICATION TYPE
COMPANY	LOCATION	PROCESSES MATERIALS	PROCESSING CAPACITY
QUANTITY RECYCLING	DATE	PACKAGING	

COLLECTION/SORTING			
COMPANY	LOCATION	PROCESSES MATERIALS	PROCESSING CAPACITY
QUANTITY REUSE/RECYCLING /DESTROY	DESTINATION LOCATION	PACKAGING	DATE
	IDENTIFICATION TYPE	REFERENCE	

END OF LIFE	
COMPANY	
LOCATION	
TYPE OF PROCESSES	
COMPOSITION MATERIALS	
WEIGHT QUANTITY	
PACKAGING	
DATE	
REFERENCE IDENTIFICATION TYPE	

AFTER-SALE (REPAIR, CLEANING, UPCYCLING...)	
COMPANY	
TYPE OF SERVICE	
DATE	
LOCATION	
REFERENCE IDENTIFICATION TYPE	



RAW MATERIALS & PROCESS							REFERENCE	IDENTIFICATION TYPE
COMPANY (TIERS 4)	LOCATION	COMPOSITION MATERIALS	WEIGHT QUANTITY	TYPE OF PROCESSES	DATE	PACKAGING		

RAW MATERIALS CONVERSION							REFERENCE	IDENTIFICATION TYPE
COMPANY (TIERS 3)	LOCATION	COMPOSITION MATERIALS	WEIGHT QUANTITY	TYPE OF PROCESSES	DATE	PACKAGING		

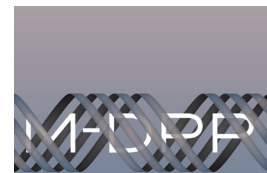
COMPONENT							REFERENCE	IDENTIFICATION TYPE
COMPANY (TIERS 2)	LOCATION	COMPOSITION MATERIALS	WEIGHT QUANTITY	TYPE OF PROCESSES	DATE	PACKAGING		

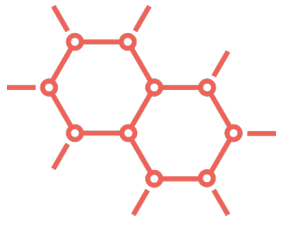
PRODUCT ASSEMBLY							REFERENCE	IDENTIFICATION TYPE
COMPANY (TIERS 1)	LOCATION	COMPOSITION MATERIALS	WEIGHT QUANTITY	TYPE OF PROCESSES	DATE	PACKAGING		

FINISHED PRODUCT								REFERENCE	IDENTIFICATION TYPE	
BRAND	DESCRIPTION	COMPOSITION	COLOUR	SIZE	COSTS	WEIGHT QUANTITY	PACKAGING	DATE		

TRANSPORTS				REFERENCE	IDENTIFICATION TYPE
COMPANY	MEANS	DISTANCE	DATE		

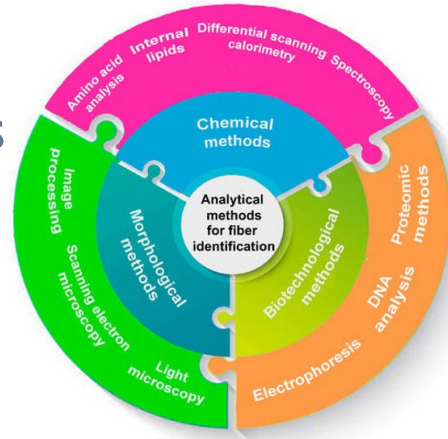
EVALUATIONS: company, processes, products						
QUALITY TEST	ENVIRONMENTAL IMPACT	SOCIAL IMPACT	HEALTH IMPACT	ANIMAL IMPACT	CERTIFICATION	AUDITS





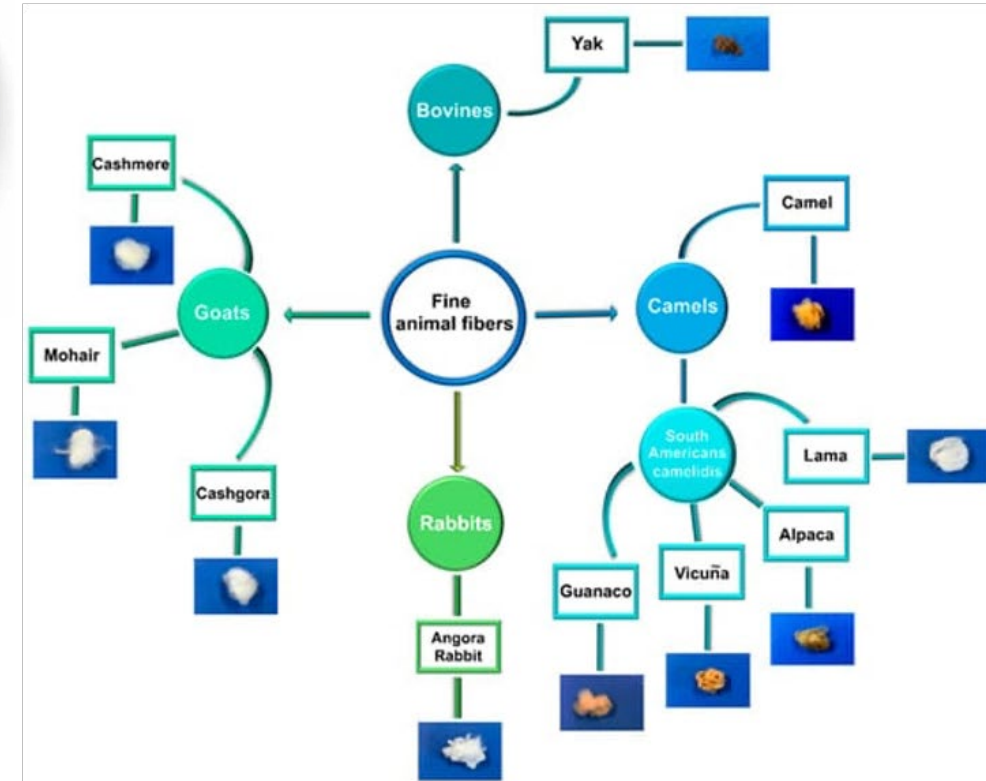
# Putting the M in DPP

- Laboratory-based molecular identification
- MOLECULAR CHARACTERIZATION of materials
- Focus on biotech methods because they offer the highest specificity
- Connects spectral and chemical fingerprinting of fibers with a Web3-powered digital infrastructure.



## Genetic Traceability

Reliably distinguish between different species  
 Probable traceability down to the individual animal



## Protein Identification

Journal of Proteomics  
 Volume 75, Issue 14, 19 July 2012, Pages 4315-4324

Review  
 Unravelling the proteome of wool:  
 Towards markers of wool quality traits ☆

Jeffrey E. PLOWMAN, Santanu Deb Choudhury, Stefan Clerens, Anny Thomas, Charisa D. Cornwellson, Jolon M. Dyer

https://doi.org/10.1016/j.jprote.2012.09.027

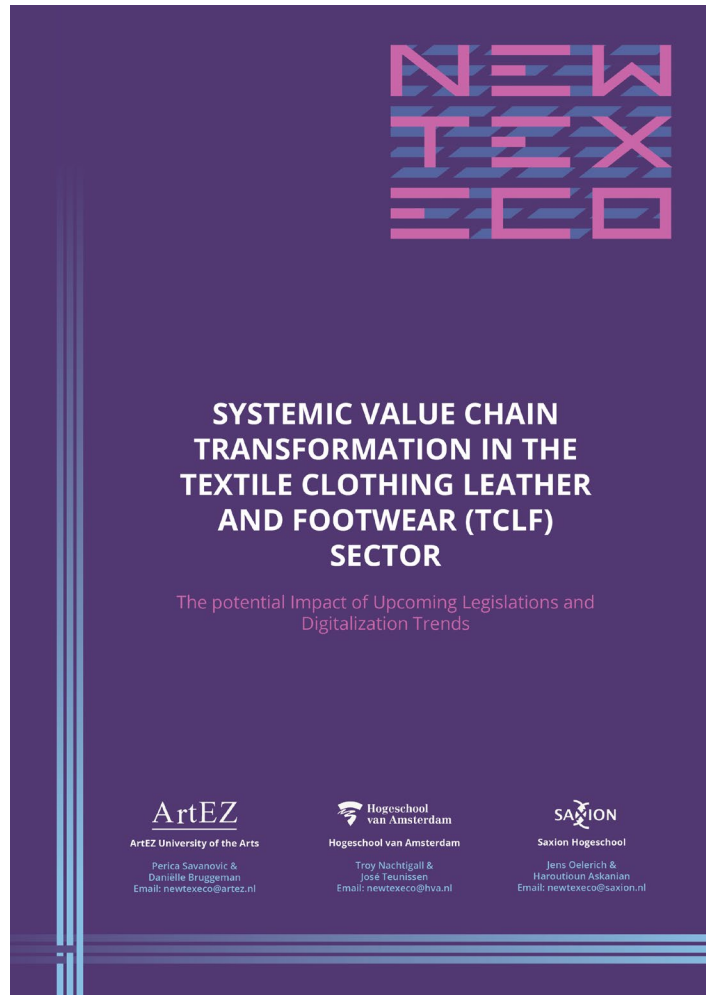


sortile.co

02

# White paper presentation

# New Textile Ecosystems – white paper



Areas discussed in the paper:

- Analysis of the trends in the European and Dutch value chain, including cost-price perspective, material flows, and social significance.
- Overview of the legislative proposals taking shape at the European level with early implementations of EPR and DPP.
- Digital implication for government (macro), businesses (meso), and users (micro) in joining the assessment of the value chain in an ecosystem-wide collaboration.

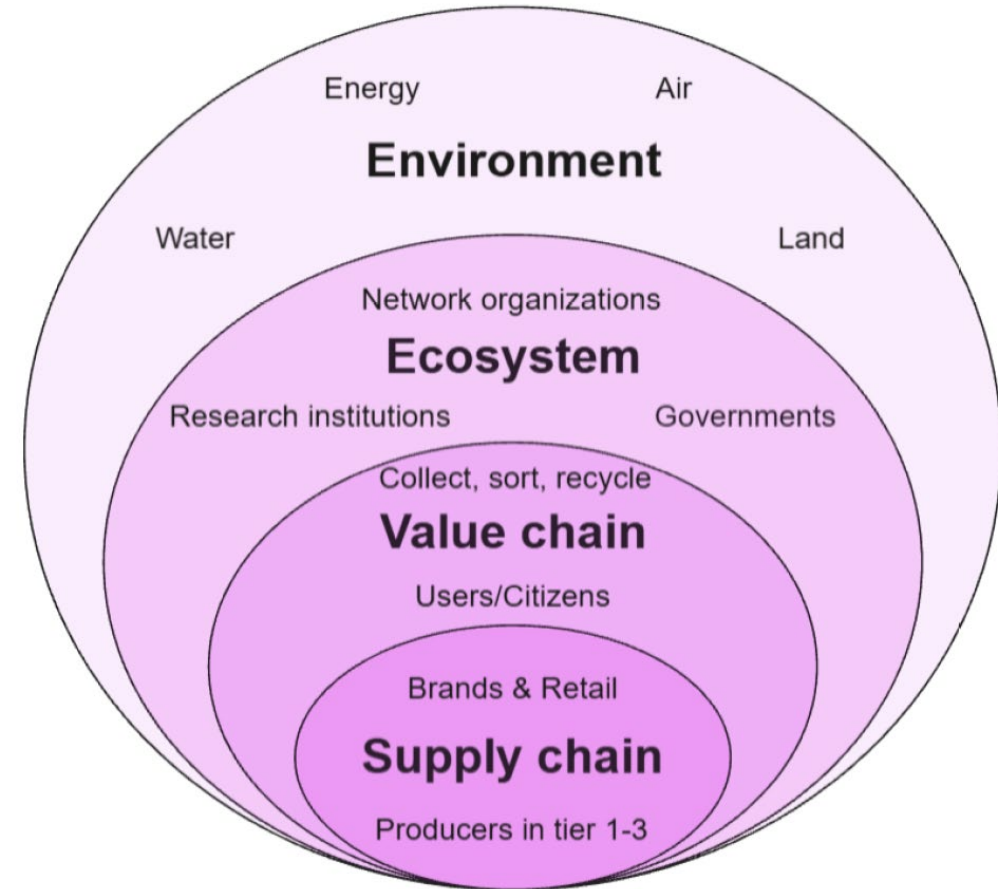
<https://doi.org/10.21943/auas.30763382>



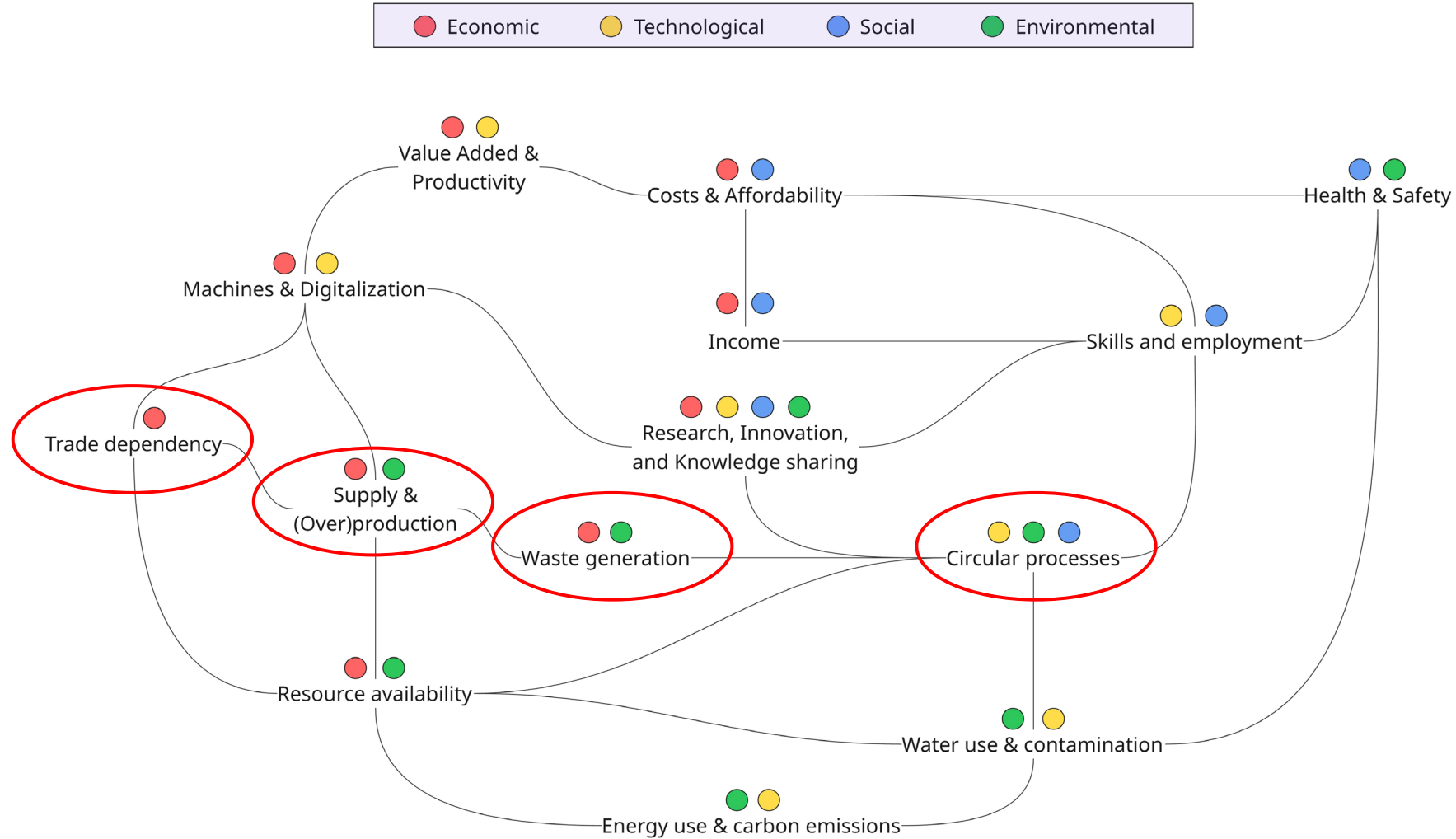
# Stakeholder collaboration

Various actors in the ecosystem seek higher levels of collaboration that can be facilitated by the new digitally-enabled information flows.

This representation also aims to clarify the definition of supply chains, value chains, and ecosystem, discussing the challenges and responsibilities of the various actors.



# Holistic approach to enhance the debate



# Material Flow Analysis TCLF in EU

“The EU exports more than it produces, and imports more than it consumes”

*Sankey diagram visualization of EU Material Flow Analysis (MFA)*

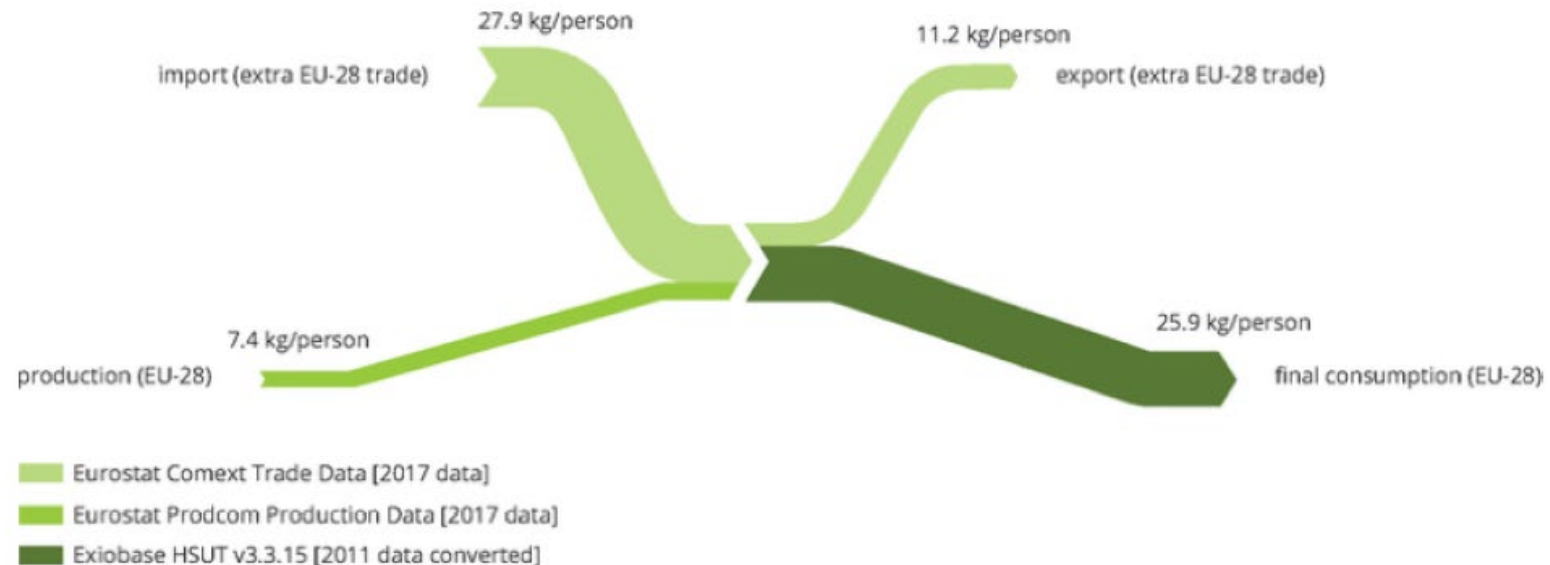


Figure 3: Latest MFA from European Environmental Agency (2019) with 2017 data (link broken a few days before the publication).

# Trade deficit in the Netherlands

Monetary flows of imports and exports in the Dutch TCLF sub-sectors

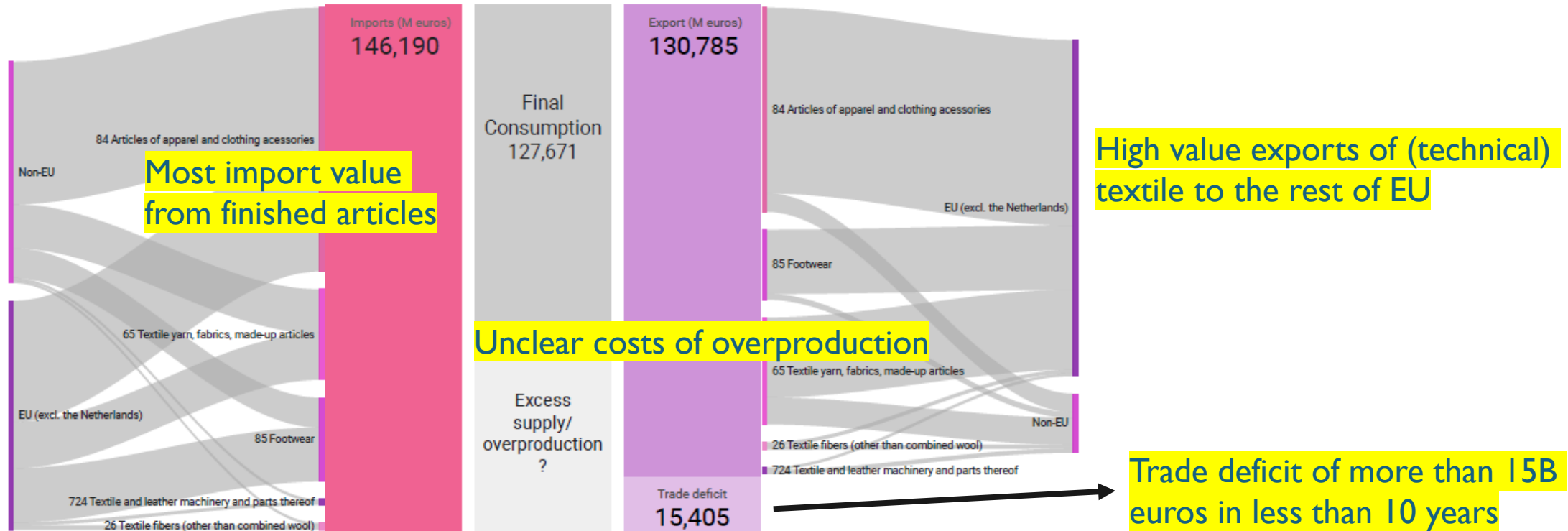


Figure 4: Self-produced Monetary Flow Analysis of Dutch imports and exports. Consumption data are from CBS National accounts but excess supply/overproduction is hard to single out given the uncertainty related to the share of local production and import for re-exports.



# Overproduction and overconsumption

## Gap between textile supply and user demand

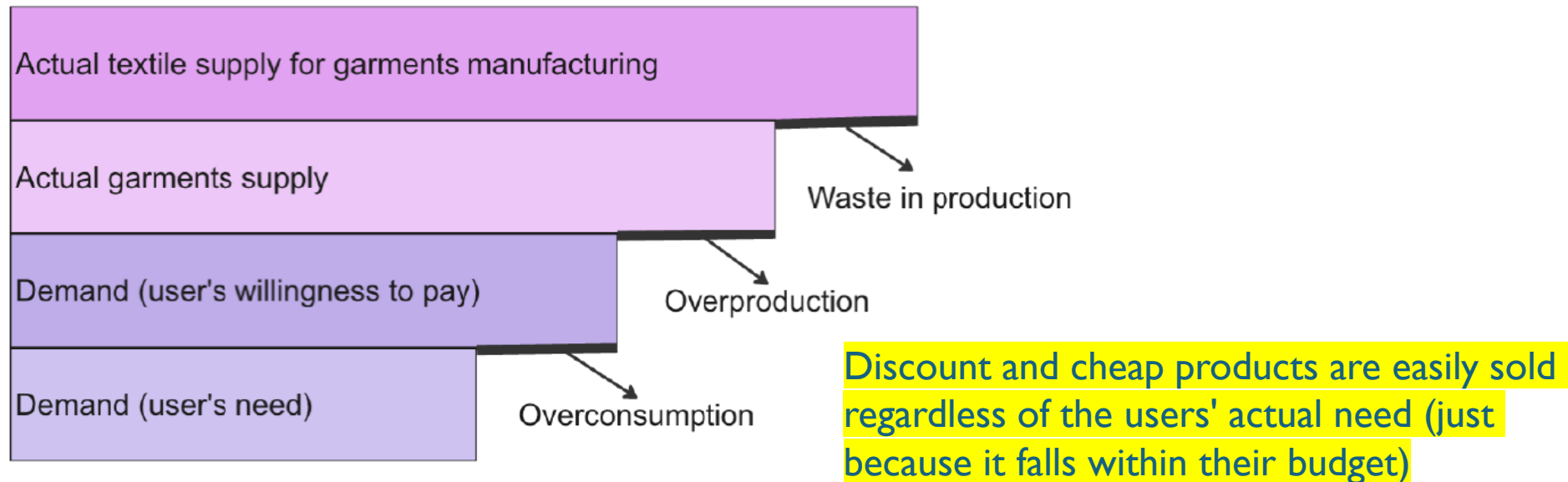
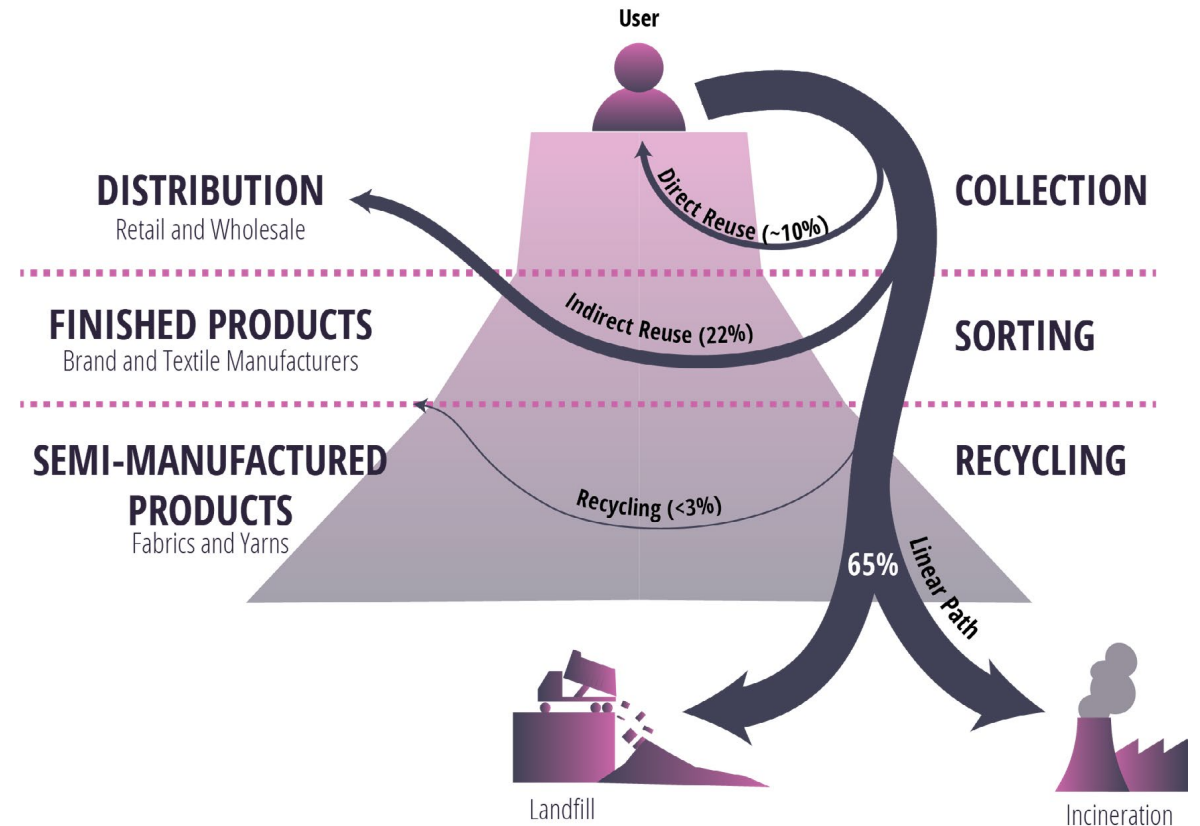


Figure 8: Relationship between demand and supply and their contribution to overconsumption phenomena (own representation).

# Circular flows measurement

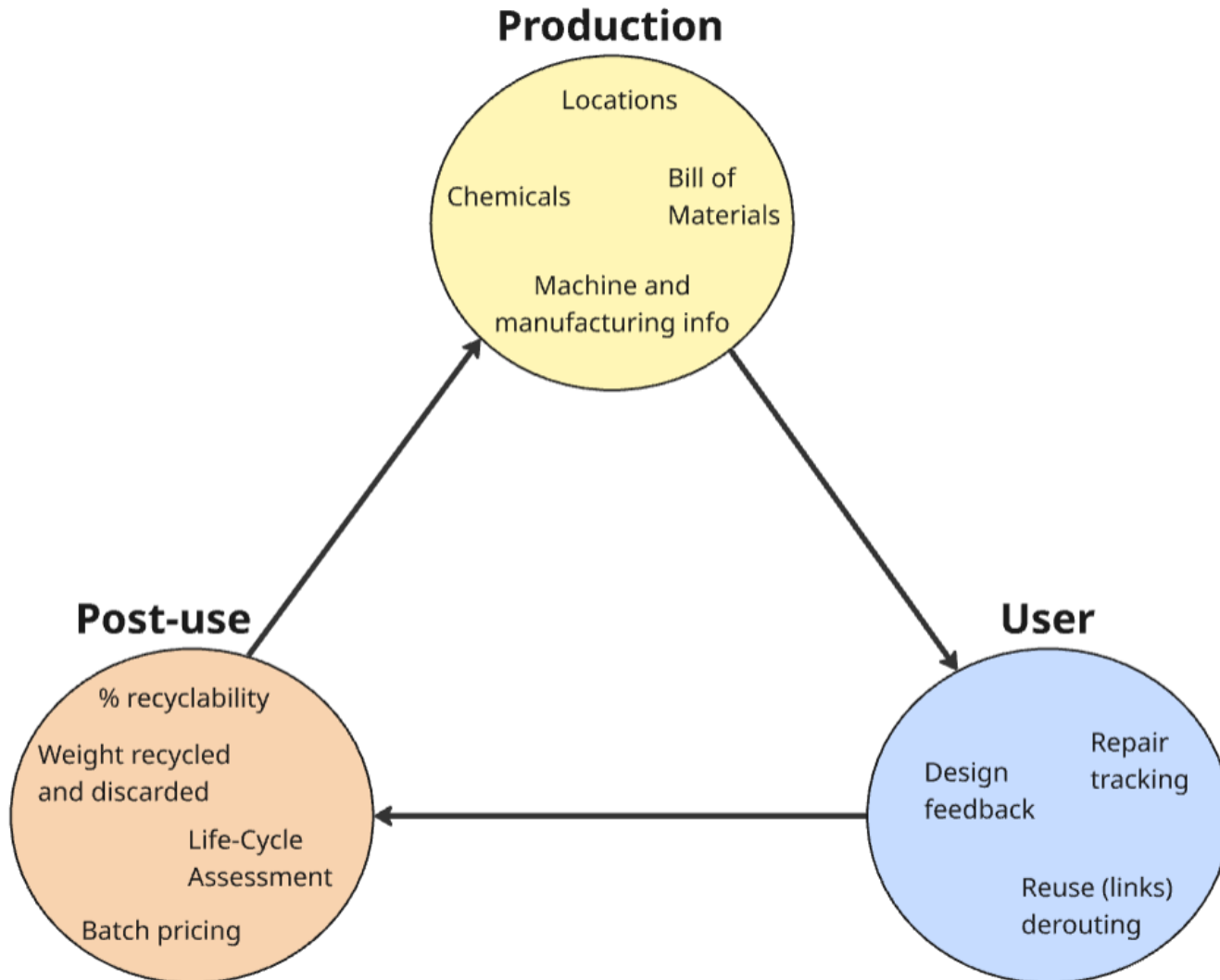
The increasing volume of textile products in circulation is putting enormous pressure on the waste sector that currently cannot really handle **circular processes** efficiently.

Improving **information flows** is crucial to sorting activities and to increase recycling rates. The DPP is one of the most important tools that could facilitate the **value recovery** from textile products.





# Digital Product Passport: information spheres



The three information spheres created by the DPP will provide more visibility on:

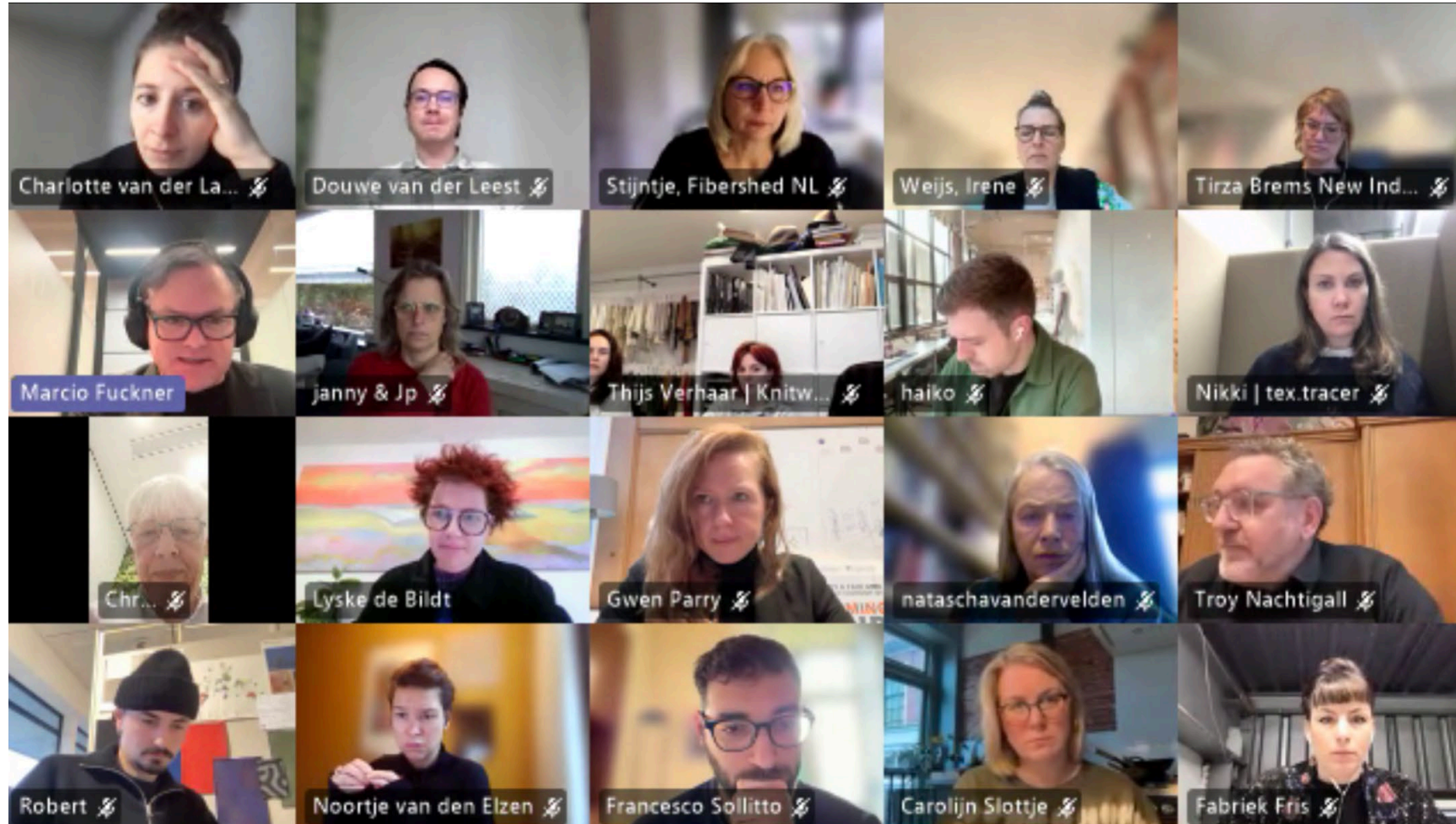
- Geographical trade routes of the supply chain and detailed production impacts and chemical composition
- Users can share feedback, and interaction data about their products (resell, repair, recycle)
- Collectors and sorters can quantify more easily the quantities sorted and reserve batches to specialists that can maximize recycled content.



03

# Recap / Results Workshop #1

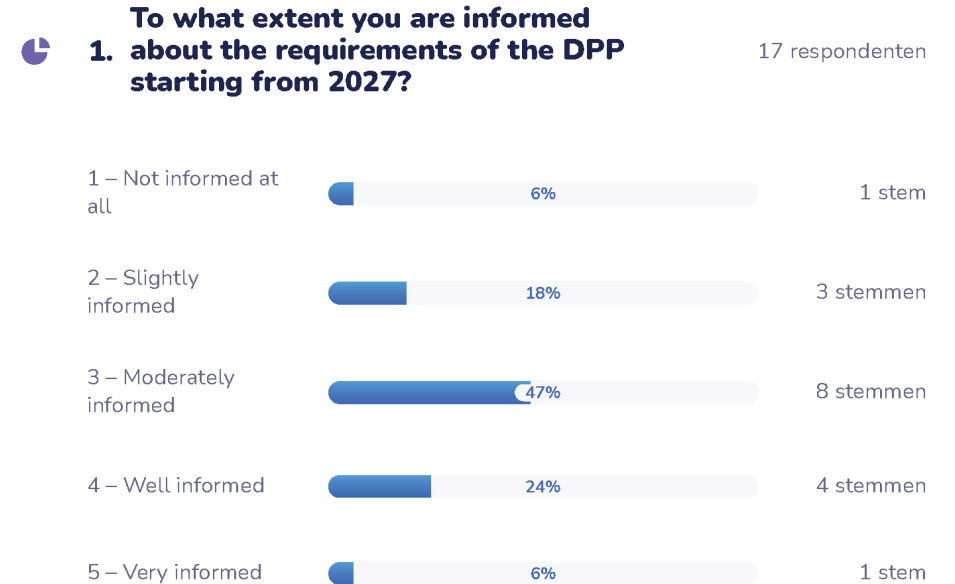
# Industry Living Lab Workshop #1



# Awareness exists - operational clarity does not

- The issue is not “What is a DPP?”
- The issue is “What does this mean for me in practice?”
- Knowledge is uneven across the value chain
- SMEs need translation from regulation → workflow → data

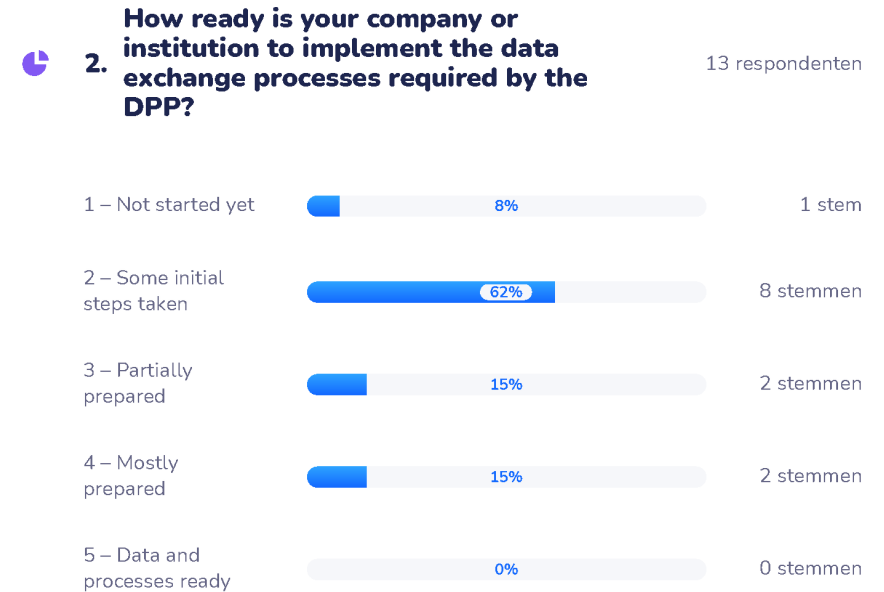
**What this means for the Living Lab**  
Focus on practical requirements, not theory  
Clarify responsibilities per role in the chain



# DPP readiness is perceived as a chain problem, not an individual one

- Low to moderate self-assessed readiness
- Barriers are external, not internal
- Strong dependency on suppliers, customers & standards
- Implementation is seen as systemic coordination

**What this means for the Living Lab**  
Define what SMEs need from the system to participate — even if the chain is incomplete

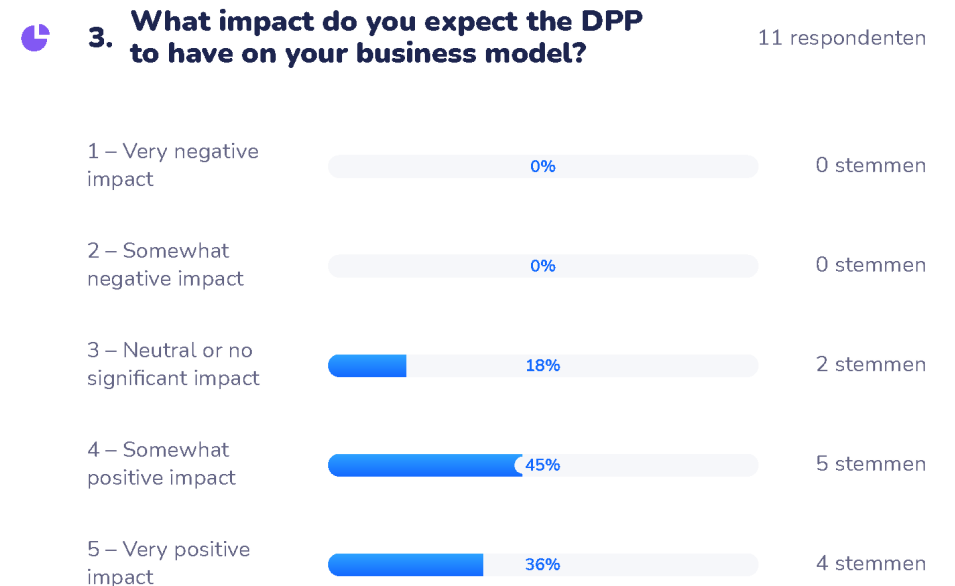


# DPPs are expected to be transformative — and disruptive

- Strong expectations of structural impact
- Perceived benefits: transparency, trust, circularity
- Concerns: administrative burden & ROI
- Fear of data exposure and competitive sensitivity

## What this means for the Living Lab

The system must enable trust — without becoming a data burden



# Challenges cluster around data, coordination and trust

## Data Availability & Reliability

“We don’t have the data — or we can’t trust the data.”

- sourcing the information
- Lack of data
- get the right info from our suppliers
- collecting the primary data
- getting reliable data from suppliers
- information sourcing

## Chain Coordination & Integration

“The difficulty is not internal — it’s exchange across the chain.”

- How we can create an order-specific DPP. We produce furniture, and each piece can be upholstered with countless different fabrics.
- Automating the data exchange throughout the chain
- Taking it into the mental design process at the start of the design stage

## Administrative & Cost Burden

“We fear this becomes expensive and bureaucratic.”

- Make it as easy/seamless as possible to create & manage your DPPs, prevent it from becoming an (administrative) burden
- Creating the digital passport itself (can be costly for smaller companies)
- Uncertainty of cost vs benefits for bigger companies

## Regulatory & Structural Uncertainty

“We don’t know exactly what will be required.”

- Knowing what data structures are required from the EU / knowing the data structures that other countries

## Strategic & Competitive Concerns

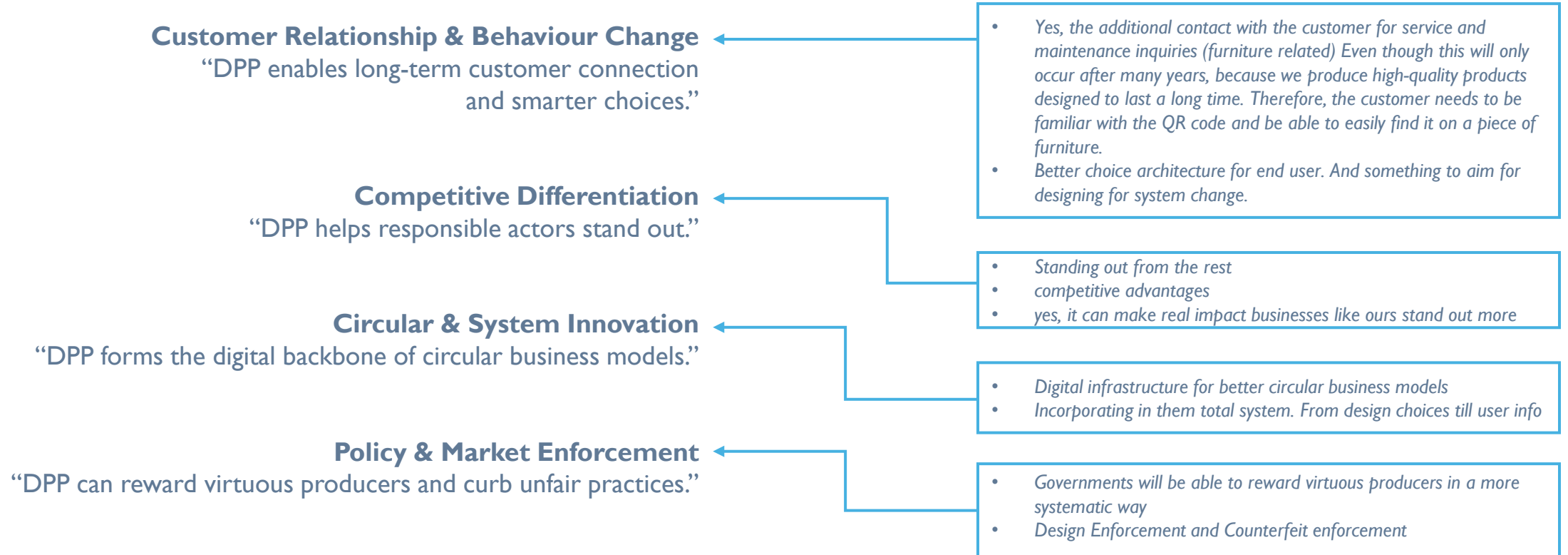
“Transparency changes the competitive game.”

- What's in it for them?
- Being transparent is a bit scary; competitive advantage disappears
- Greenwashing from bigger corporations
- developing / adopting a method for impact calculation of our production process that is generally accepted by consumers

Through the Industry Living Lab series, M-DPP tackles these challenges by jointly defining practical requirements, clarifying roles across the chain, and scoping a feasible first system version for SMEs.



# Opportunities cluster around value, differentiation and system change



Through the Living Lab series, M-DPP translates these opportunities into concrete system conditions that enable differentiation, circularity and fair competition in practice.



## From Insights to Conditions

**Today, don't think about solutions. Think about conditions.**

What must be true in the ecosystem for DPP to work in practice?

### **As you map the ecosystem, ask yourself:**

- Where does data break down — and why?
- Where does trust need to be earned — and how?
- Where does value actually circulate — and for whom?

# 04

## Summary of interviews

In January 2026, five in-depth interviews were conducted with pioneering stakeholders from the fashion and textile sector. The goal was to capture concrete user insights into Digital Product Passports (DPPs). Each interview highlighted a distinct user perspective



# The stakeholders:

- A Circular and modular design innovator with a strong data-driven vision.
- A Retail organization managing decentralized stores and complex data supply chains.
- A Cultural producer focused on material innovation, archiving, and digitization.
- A Local Micro maker seeking efficient, affordable tools and physical tagging methods.
- An IT start-up aiming for European-scale interoperability and data governance.

# Interview insights

- Pioneers see DPPs as a way to gain control over material data, traceability, and brand positioning.
- Motivation varies per segment: from compliance and archiving to marketing, circularity, or local-first production.
- Existing tools are too complex or expensive; manual work remains dominant.
- While urgency is present, adoption is fragmented — simple, accessible solutions are needed.

**BREAK**

05

# Intro M-DPP



# Introduction to Molecular Digital Product Passport (M-DPP)

- enhancing textile traceability and sustainability through **molecular identification technologies** and compliance with European regulations

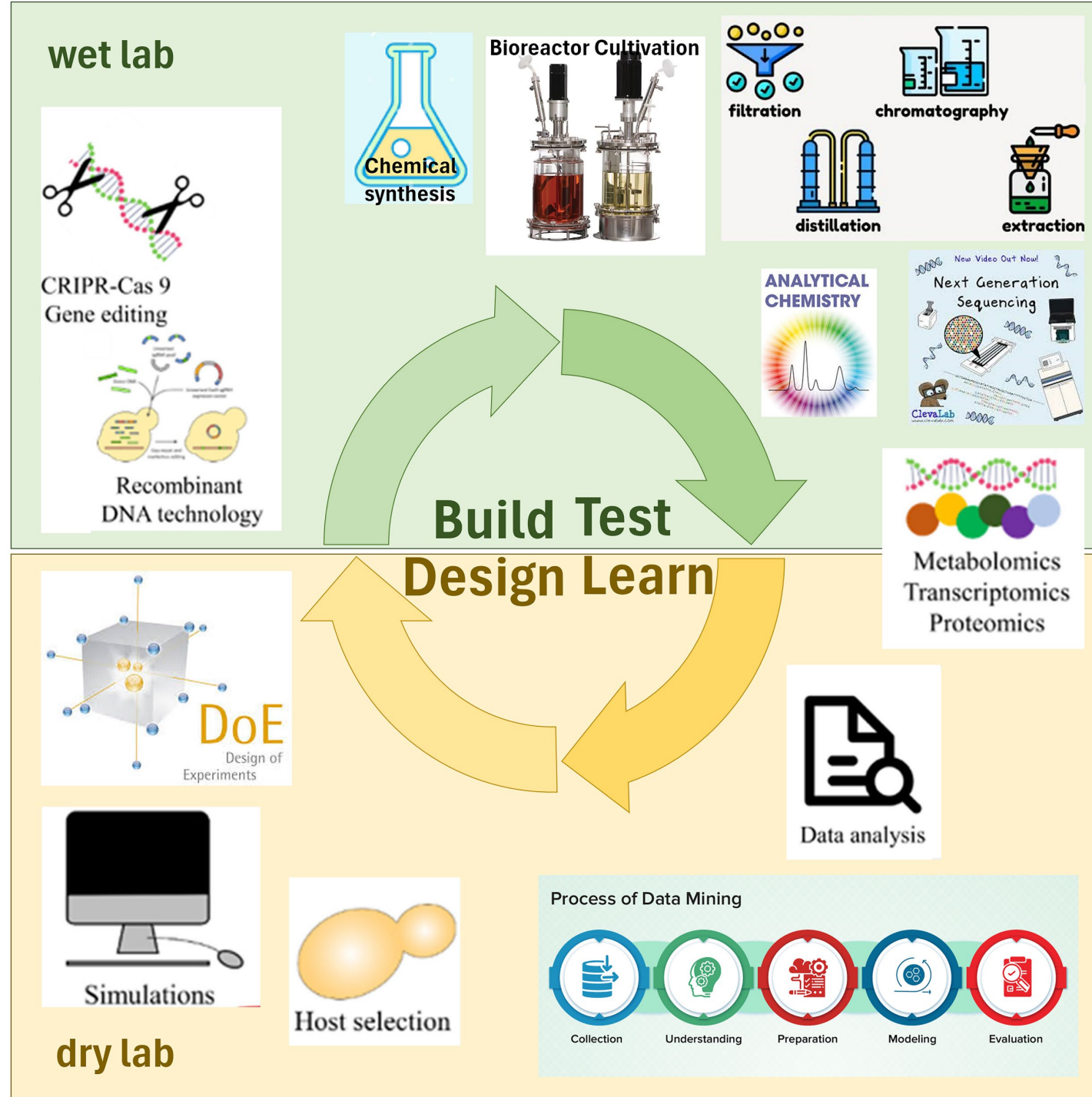


# LECTORAT BIOBASED INNOVATIONS

## KEY TECHNOLOGIES

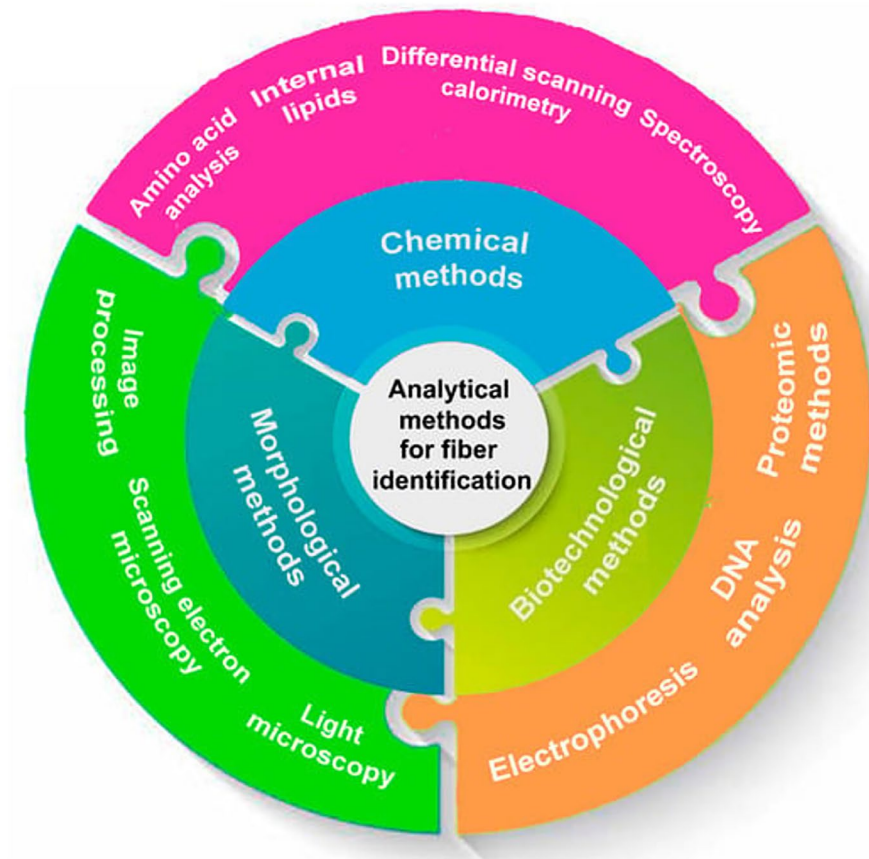
- Moleculaire Biologie** (CRISPR Cas; qPCR; NGS)
- Fermentatie** (Bioreactoren; Enzymen; Biobouwstenen)
- Analytische Chemie** (Bioraffinage/Scheidingstechnieken; GC en LC MS)
- Bioinformatica | Data Science** (Data Mining & Analyse; Interfacing; XAI)

## DBTL CYCLUS (WET | DRY)



# M-DPP: the Molecular database

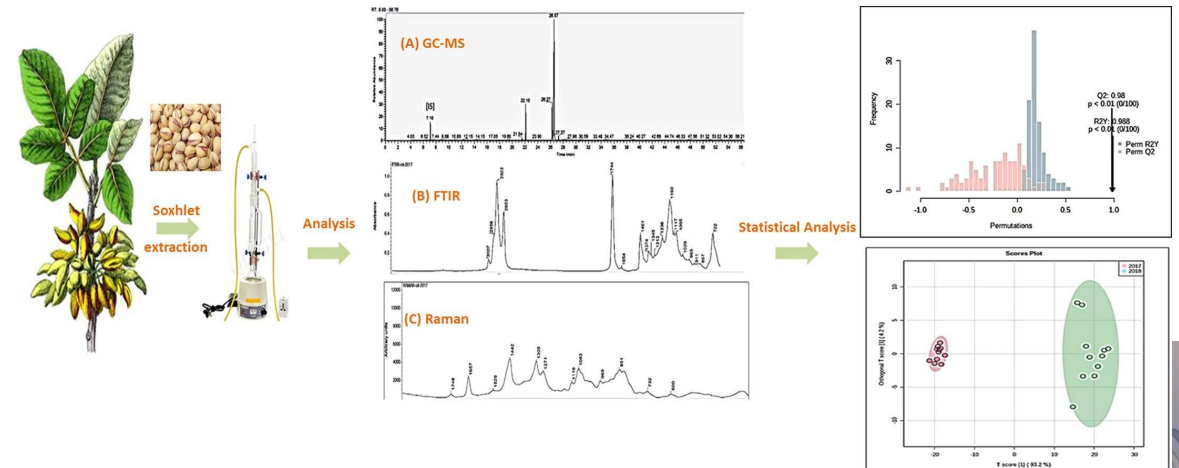
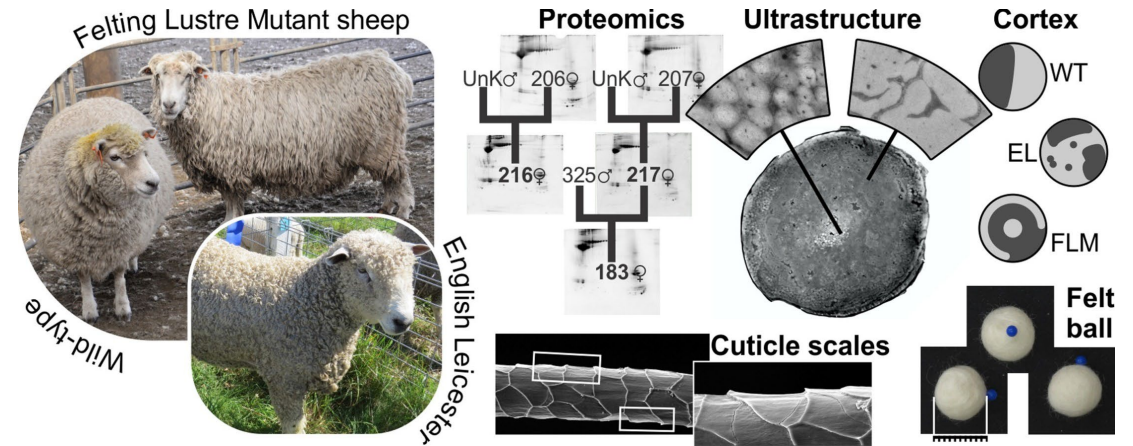
- Using analytical methods for fiber molecular identification and characterization
- Cellulose based
  - Cotton
  - Linen (flax),
  - Hemp, Jute, Bamboo
- Protein based
  - Silk (worm)
  - Wool (Sheep)
  - Cashmere (Kashmir goat)
  - Mohair (Angora goat)
  - Alpaca (Alpaca)
- Synthetic based
  - .....



Physical, chemical and molecular data

# M-DPP: the Molecular database

- What is there?
  - On various levels
  - Individually tracking?
- What is the composition?
- Where they are coming from?



# The M-DPP system

- analytical methods enable materials to serve as their own identifiers.
- no reliance on external tags or databases
- leads to advanced techniques for deriving precise compositional fingerprints of textile fibers.
- crucial for achieving tier 0 transparency in textile products.
- combines material-based identification with a digital infrastructure for real-time verification.
- allows independent validation of product claims using embedded material signals.

**06**

## **Participatory Part:**

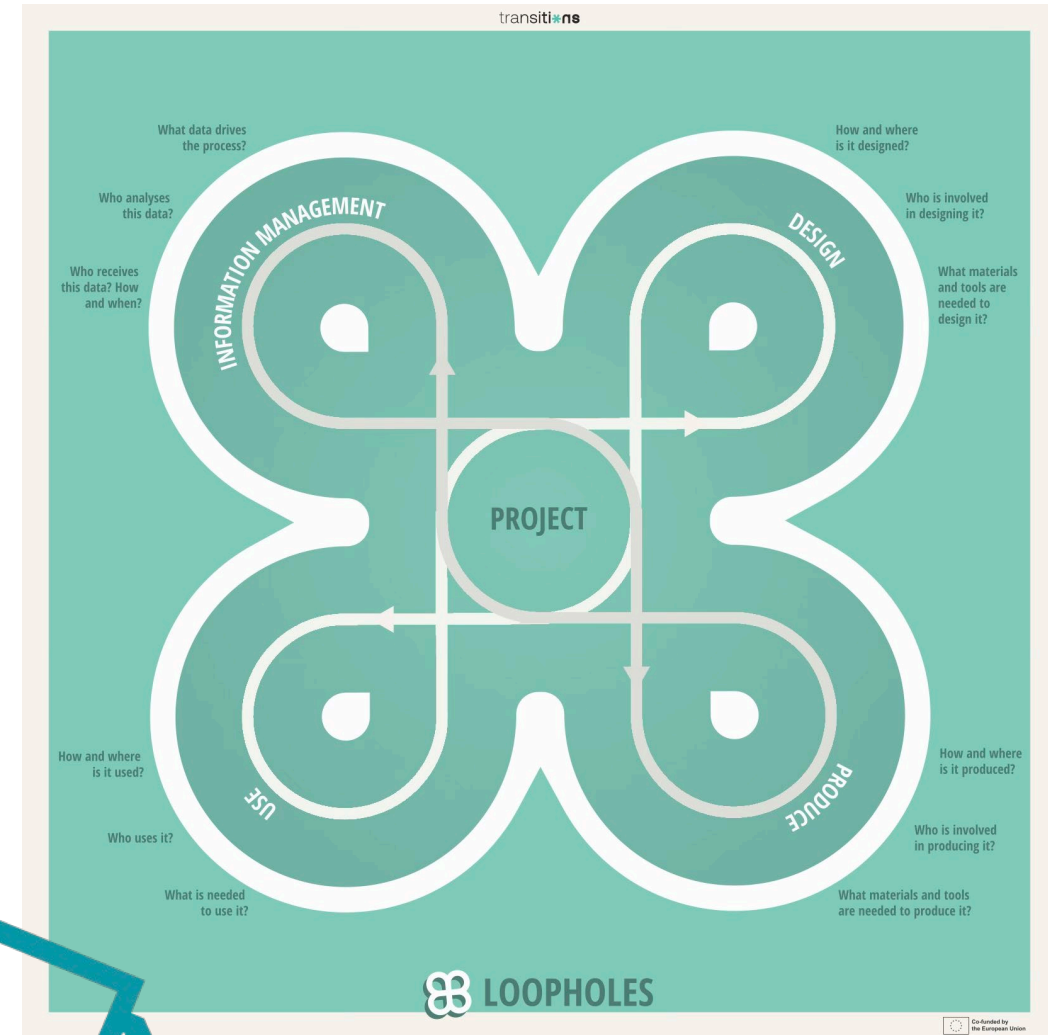
Mapping opportunities and needs  
using  
the Loopholes stakeholder canvas

# Transitions Project Circular Loopholes

How Does your business or practice change when DPP's are Mandatory?

What can DPP enable that you are not currently doing?

How can we make this simple for you and your value chain to use?



# Questions Workshop 2:

- Beyond the basics, What will you do with DPP
- How can we make DPPs accessible and easy to input for small producers with limited (IT) capacity?
- How might DPPs serve as documentation and archiving tools that evolve after they've been brought in circulation?
- How can decentralized retailers connect and standardize data flows effectively?
- How should DPP data be visualized (what do different users get from the data in DPPs) to benefit both end-users and B2B partners?
- What is needed to enable European interoperability without causing further market fragmentation?

06

# Outro and Findings

