Decouple

Pioneering Circular Solutions for Textile Systems

Decoupling Resource Use from Economic Growth Through Innovative Strategies

elis

ID IDENTITY

SDU

KOLDING SCHOOL OF DESIGN

New Retex

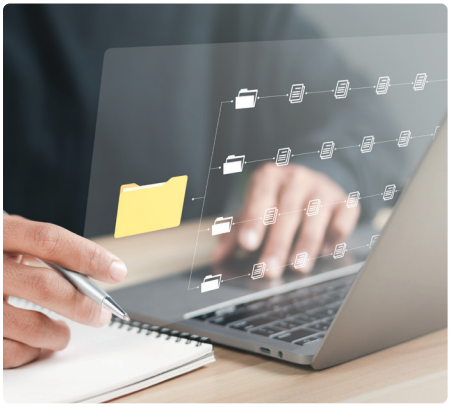
trace
a transition towards circular economy

DANISH TECHNOLOGICAL INSTITUTE

The DECOUPLE project has advanced circularity in textiles by developing data-driven tools, new assessment standards, and practical solutions for repair, remanufacturing, and reuse. Prototype t-shirts with high recycled content showed technical potential, but quality and cost remain barriers to large-scale adoption. The project found that extending product lifespans delivers stronger environmental and economic benefits than recycling alone and highlights the need for procurement reforms to scale circular textiles in both public and private sectors.

Optimization of data systems and laundry processes

The Decouple project delivered valuable insights, practical tools and strategies to help Elis optimize its processes, resulting in both environmental and economic benefits:



- Upgraded Data systems, to better identify key discard reasons and maximize value extraction from garments.
- Important analyses focusing on why garments are discarded.
- Actionable guidelines and tools to extend product lifespan, like avoiding logos, patching stains, and implementing an objective discard assessment tool.
- Critical factors in laundry operations were identified that influence product durability.

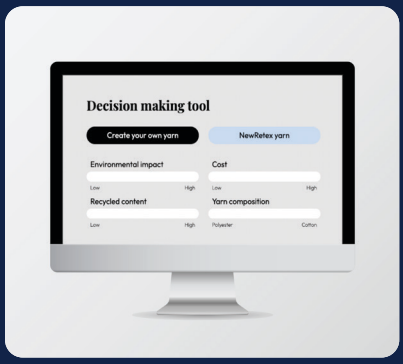
Comparing Life Cycle Assessment (LCA)

Two LCAs were conducted, comparing the DECOUPLE T-shirt (produced by ID with NewRetex yarn based on discarded Elis textiles) to a commercial virgin-based T-shirt. The LCA finds a reduced impact in production of the T-shirt with recycled content. To validate the full impact of the lifecycle a user phase test must be conducted.

T-shirts with Recycled Content

The consortium has successfully developed and produced T-shirts with 63-100% recycled content based on discarded Elis textiles. Though the final product did not meet the required price or quality required for use in public tenders the process and production gain valuable insights and learnings:

- Carefully analyze input materials and fiber quality before starting new recycled productions.
- The DECOUPLE yarns achieved approved yarn quality by e.g. prioritizing a recycled fiber blend with an increased content of long fibers.
- High levels of post-consumer fibers can reduce comfort and appearance; lower content may improve quality.
- All supply chain steps; yarn production, knitting and dye house must be addressed to optimize quality and meet laundry requirements.
- Recycled content t-shirts are costlier, making price a barrier in public tenders; recycled fibers should be a key criterion in procurement.



Recycled Yarn Decision-Making Tool

KDSD, SDU and NewRetex have developed a prototype of a decision-making tool to help identify if recycled content or virgin materials are preferable, depending on design, cost, and environmental impact. The tool accounts for design decisions like fiber input, yarn count, spin type, production size, dyeing, and production sites . It serves as guidance, relying on high-level estimations and simplified scenarios, and results may differ in specific cases. The tool helps users understand how design choices — such as composition or spin type—affect cost and environmental footprint. The tool will be avalible at fiber-family.com.

Key Learnings from DECOUPLE

Data-driven insight: Stronger data on discard reasons enables better decisions, targeted action, and longer garment lifespans.

Input material and processing: Selection and analysis of input materials and focus on spinning, knitting and dyehouse finishing are crucial for successful recycling and refurbishment.

Recycled content: High recycle content is technically feasible but currently leads to higher price and challenges with comfort and appearance—mixing recycled and virgin fibers optimizes performance.

Extending textile lifespan: Avoiding logos, repairing with transfer patches, assessing damages using an objective assessment tool, and optimizing laundry processes can prolong product life.

Decision-making tool: New tool helps choose between recycled and virgin content based on environmental impact, design demands, and production location.

Market barrier: Price is a showstopper for recycled-content products in public tenders. Policy and procurement criteria must change to support circular textiles and enable economy-of-scale.

Project Outlook

DECOUPLE has resulted in specific action points to systemic change in textile circularity, with tools and insights already driving real-world implementation. The project's methods are being rolled out nationwide at Elis.

Findings highlight the need for updated procurement policies and inspire new directions in technology, product design, and recycling innovation. The DECOUPLE project proves that coordinated, data-driven approaches can accelerate both environmental and economic benefits—pointing the way toward truly sustainable and circular textile systems.

Learn more about the project by scanning the QR code, or reach out to Signe Strange Grønborg on **sgro@teknologisk.dk**