

Circular apparel recycling: The industry's current state and designing for circularity

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Purpose

This study consisted of **interviews** with companies in the **United States** that **participate in post-consumer apparel recycling** with a resulting component that can be used in a new textile product.

Interview objectives included:

- ➔ Developing an understanding of **flows of post-consumer apparel**.
- ➔ Determine **what kind of apparel waste** is currently being processed by these companies.
- ➔ Identify **technology** currently being used for both **sorting and recycling** of apparel.
- ➔ Identify **challenges** in the **recycling process** including those that can be addressed at the **apparel design and development stages**.

Background

- ➔ The production of new apparel and disposal at end of life **can have negative effects on the environment** (Gam, et al., 2010).
- ➔ Designers' decisions affect up to **70%** of a garments ability to be recycled.
- ➔ In 2018 the EPA estimated the **US generated 17 million tons** of textile waste (EPA, 2018).
- ➔ Underutilized textiles represent **billions of dollars of lost opportunities** for reclamation (Ellen McArthur Foundation, 2017).

Methods

- ➔ Participant interviews were recorded either in person or with an audio via a virtual video call.
- ➔ The interviews lasted 35-40 minutes and were collected between April and August of 2023.
- ➔ A thematic analysis was conducted to code content and align themes with four defined research objectives.

Participants

Company	Type of Recycling	Location
Ambercycle	Chemical	Los Angeles, California, USA
Circ	Chemical	Danville, Virginia, USA
Looptworks	Chemical/Mechanical	Portland, Oregon, USA
Material Return	Mechanical	Morgantown, North Carolina, USA

Themes

Scaling the solution to the challenge

Collaboration supports infrastructure

The doozy of reverse logistics

Circular by design

Perspectives

- ➔ Scaling operations is a **primary target**
- ➔ **Vertical integration** is critical
- ➔ Scaling their operations quickly was closely **related to capital investment & speed to market**
- ➔ **Revitalization** of communities within the US factored into facility location

- ➔ Collaboration is essential for **waste collection and aggregation**.
- ➔ All participants noted **it was crucial** for the **survival** their business.
- ➔ **Government intervention** is necessary to provide solutions for consumers and industry.
- ➔ Recyclers hope that **policymakers will intervene** to help **connect the consumer to industry**.

- ➔ Automation for sorting materials could **increase the amount of material** that could be processed.
- ➔ Technological solutions cannot be **fragmented** by material, there needs to be a blending of innovative technology.
- ➔ **Quality control** of post-consumer material **is a major pain point**.

- ➔ Designing new **apparel for circularity** is **essential for the future**.
- ➔ Educating designers on the **intrinsic properties of materials** could lead to more intentional design.
- ➔ **Material selection** is somewhere **designers have potential to make an impact** on end-of-life waste management of a garment.

Quotes

"So, the core goal that we have right now is how do we get this technology scaled to commercial volumes to make a dent in the huge volumes that are currently affecting us – are affecting our landfills and our environment." - Recycler 1

"So design for deconstruction is also a pretty big topic that design schools need to be taken into play."- Recycler 4

"There's a lot of government policy we need – Well, I'm not talking about like, an entire city saying, you can't throw textile waste in the landfill because that doesn't fix the issue."- Recycler 3

"Overtime education is probably the best way to essentially create the tool kits required to make decisions that are better for our environment." - Recycler 1

"Well see that's the thing, they don't really know what the materials are...I think it's really understanding and this is what sustainable designers are doing is they're looking at the full you know, how is this the full cycle of that product?" - Recycler 2

Discussion

Overall, all participants provided information that gave context to the lacking circular recycling infrastructure for post-consumer apparel within the US. Some of their largest challenges centered around scaling, further need for collaboration and building of community, material blends, and a lack of awareness from product developers and designers.

References

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