



## Sourcing Opportunities for Clothing Made from Recycled Textile Materials: Insights from U.S. Retailers

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### Background

With consumers' growing interest in fashion sustainability and reducing the environmental impact of textile waste, retailers increasingly carry clothing made from recycled textile materials (Fonte & Xydis, 2021). Numerous studies have attempted to understand the production and consumption of clothing made from recycled textile materials or consumers' purchasing behavior for such products (e.g., Cao, 2021, Kim et al., 2021). However, as a critical research gap, where clothing using recycled textile materials is typically made, and what their supply chains look like remain a "black box."

**This study explored U.S. retailers' sourcing strategies for clothing made from recycled textile materials.** Specifically, the study identified U.S. retailers' most-utilized sourcing base for clothing using recycled textile materials and the key factors affecting the sourcing patterns. The study's findings created critical new knowledge that contributed to our understanding of the supply chain of clothing made from recycled textile materials, which turned out to be quite different from regular clothing using virgin fibers.

### Literature review

In theory, U.S. retailers could implement several unique sourcing strategies for clothing made from recycled textile materials. **First**, as producing clothing using recycled textiles can be either labor or capital-intensive, according to the factor proportion trade theory, no particular country can theoretically dominate the supply (Irick & Eike, 2020). Instead, U.S. retailers would likely source clothing made from recycled textiles from diverse countries. **Second**, developing countries with abundant cheap labor would theoretically have a cost advantage in producing clothing made from recycled textiles over developed countries, where the production typically relies on expensive machinery and a high-cost workforce (Marques et al., 2020). **Third**, disparities in apparel production capacity may lead U.S. retailers to source relatively more complex or diverse product categories from Asian or European countries than American and African countries (Hasan, 2018; Alam et al., 2019).

### Methods

The study's data was collected from EDITED, a fashion big data tool (EDITED, 2023). Based on the latest data available, 3,500 SKUs of clothing items made from recycled textile materials for sale in the U.S. retail market between January 2019 and August 2022 were randomly selected (i.e., the item was 100% made from recycled textile materials according to its product description). The selected 3.5-year period was also long enough to reveal relatively stable sourcing patterns. For the study, the following information was drawn from EDITED's raw data:

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- *Assortment diversity*: the number of SKUs available for the clothing item (e.g., Assortment diversity=5 means a clothing item has five different sizes or colors).
- *Product sophistication*: the technical sophistication of making the clothing item. Based on EDITED's categorization, *Product sophistication* used a 3-point rating scale: simple products=1 (i.e., T-shirts, shirts, swimwear, and hosiery); medium sophisticated products=2 (i.e., bottoms and tops other than T-shirts and shirts); sophisticated products=3 (i.e., outerwear, dresses, and suits).
- *Market segment*: the market segment of the clothing item. Based on EDITED's classification, *Market segment* used a 4-point rating scale: if a clothing item targeted value market =1; mass market =2; premium market =3; luxury market =4.
- *Retail price*: a clothing item's listed original retail price according to EDITED.
- *Development*: according to information from the product label, if the clothing was made by a developed country=1 and if it was made by a developing country=0. The country grouping was based on the United Nations (2022) classification.
- *Region*: the origin of where the clothing item was made, such as Asia, Europe, America, and Africa (United Nations, 2022).

Given the research objectives and nature of the data collected, the multivariate analysis of variance (MANOVA) technique was adopted for the data analysis. MANOVA is commonly used to compare the mean value of observation vectors and see whether they are sufficiently different between groups. MANOVA also has the advantage of dealing with multiple dependent variables in the model without inflating Type I errors (Todorov & Filzmoser, 2010).

### Results and discussions

Altogether, the sampled clothing items came from as many as 36 countries, including developed and developing economies in Asia, America, the EU, and Africa. Specifically: **First**, MANOVA's main effect was statistically significant at the 99% confidence level for variables *Development* and *Region* ( $p\text{-value} < .01$ ) based on Pillai's trace test. The results indicate that an exporting country's economic development level and geographic location statistically impacted the type of clothing made from recycled textile materials that U.S. retailers sourced from there. **Second**, the between-subjects test show that the average retail price of sampled clothing items (i.e., *Retail price*) sourced from developed countries was higher than those from developing ones and statistically significant ( $F\text{-value}=48.3, p\text{-value} < .01$ ). The between-subjects test also reveals that U.S. retailers vary assortment (i.e., *Product sophistication* and *Assortment diversity*) for products sourced from different world regions. **Third**, Tukey's HSD test further shows that clothing made from recycled textiles that were imported from Asia and the EU had a more diverse product assortment and focused on more complex product categories than those from America and Africa ( $p\text{-value} < .01$ ).

### Implications and future research agenda

**First**, the study's findings revealed the broad supply base for clothing made from recycled textile materials and suggested promising sourcing opportunities for such products. **Second**, the study's findings indicate that sourcing clothing made from recycled textile materials may help U.S. retailers achieve business benefits beyond the positive environmental impacts, such as developing a more diverse sourcing base beyond Asia. **Third**, the study's findings call for strengthening U.S. domestic apparel manufacturing capability to better serve retailers' sourcing needs for clothing made from recycled textile materials.

With data availability, future studies can dig deeper into the supply chain of clothing made from recycled textile materials, covering tier 2 (i.e., fabric manufacturers) or even tier 3 suppliers (i.e., yarn producers). Future studies could also explore how trade policy tools, such as preferential tariffs, may support U.S. retailers' efforts to source more clothing using recycled or other eco-friendly textile materials.

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