

Beyond Breeding: Downstream Challenges for Getting Cotton into Products

Mark Messura

Senior Vice President, Global Supply Chain Marketing

Cotton Incorporated



**Thinking about the last time you
bought apparel for yourself,
what did you buy and why did
you choose that particular item?**

Purchase Drivers: Why People Buy

Comfort	95%
Fit	94%
Quality	92%
Price	91%
Durability	89%
Style	86%
Color	82%
Softness	78%
Performance Features	64%
Fiber Content	61%
Laundering Instructions	59%
Brand Name	48%
Environmental Friendliness	48%
Made in the USA	44%

So, if we know WHY consumers choose apparel, then what is the process for developing and marketing apparel?

The beginning of the apparel development process is typically 18-24 months before a product is offered for sale.





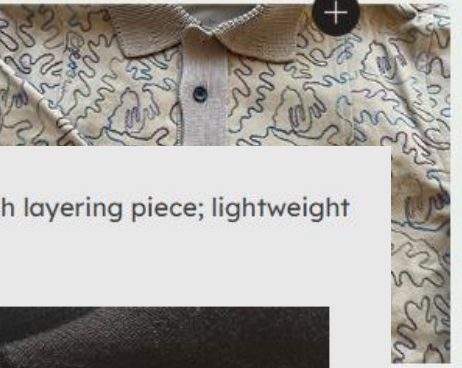
ADVA

2026

-27

COLOR STYLING





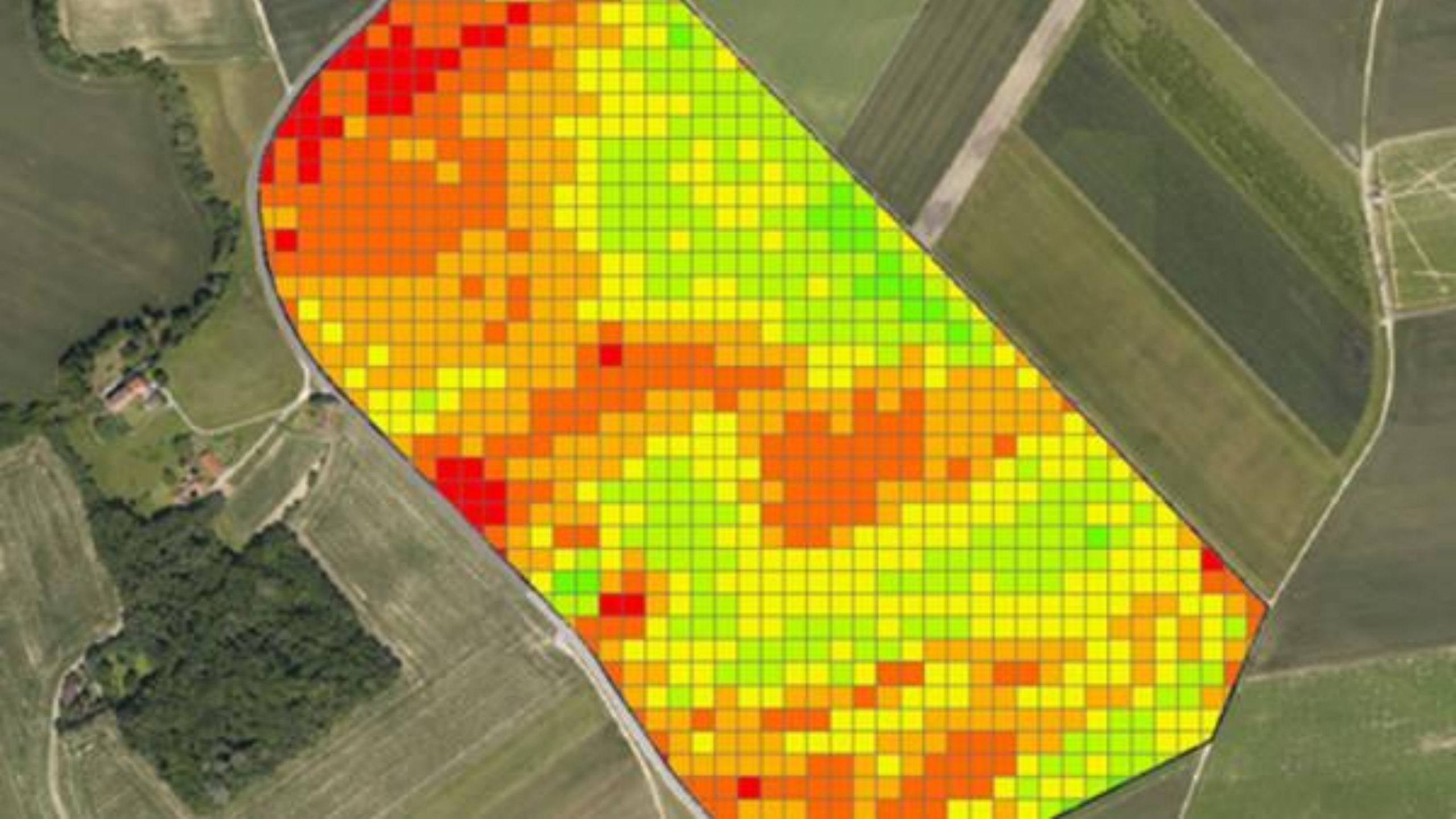
100% cotton crochet top is a creative alternative to a mesh layering piece; lightweight and breathable



CULTURED COUNTER CULTURE

Benjamin Benmoyal

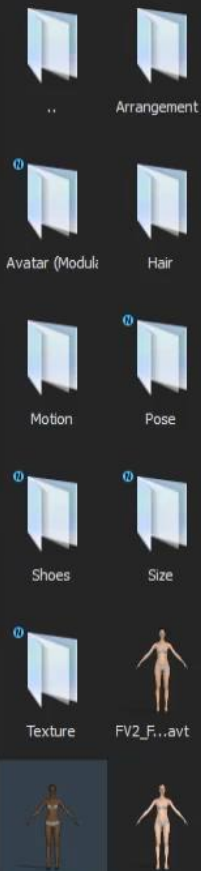




Library

Favorites
Garment
Avatar
Hanger
Fabric
Hardware and Trims
Stage
Collection 1

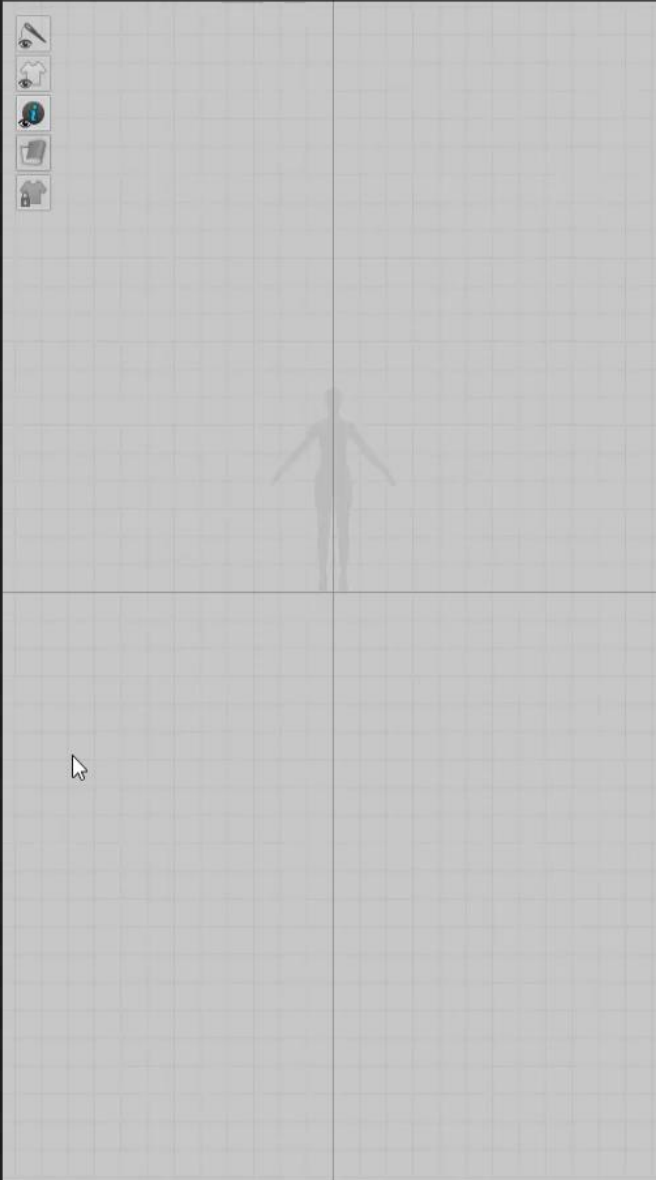
Search



W_Hoodle.zprj



2D Pattern Window



Hello, cottoninc

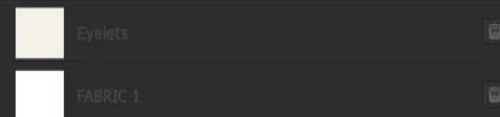


SIMULATION

Object Browser

Scene Fabric Button Buttonhole Topstitch Puckering Grad

+ Add Copy Assign



Property Editor



DK-2835-1

Double Face Jacquard
Double Knit

Project
DK-2835-1

Fabric Category
Knits, Trending Fabrics:
Spring/Summer, FABRICAST™ New
Release, 3D Digital Fabrics

Fabric Type
Double Face Jacquard, Double Knit

Fiber Content
100% Cotton

Finished Fabric Weight
5.8 oz/yd² - 197 g/m²

Technology
STORM COTTON™ Technology

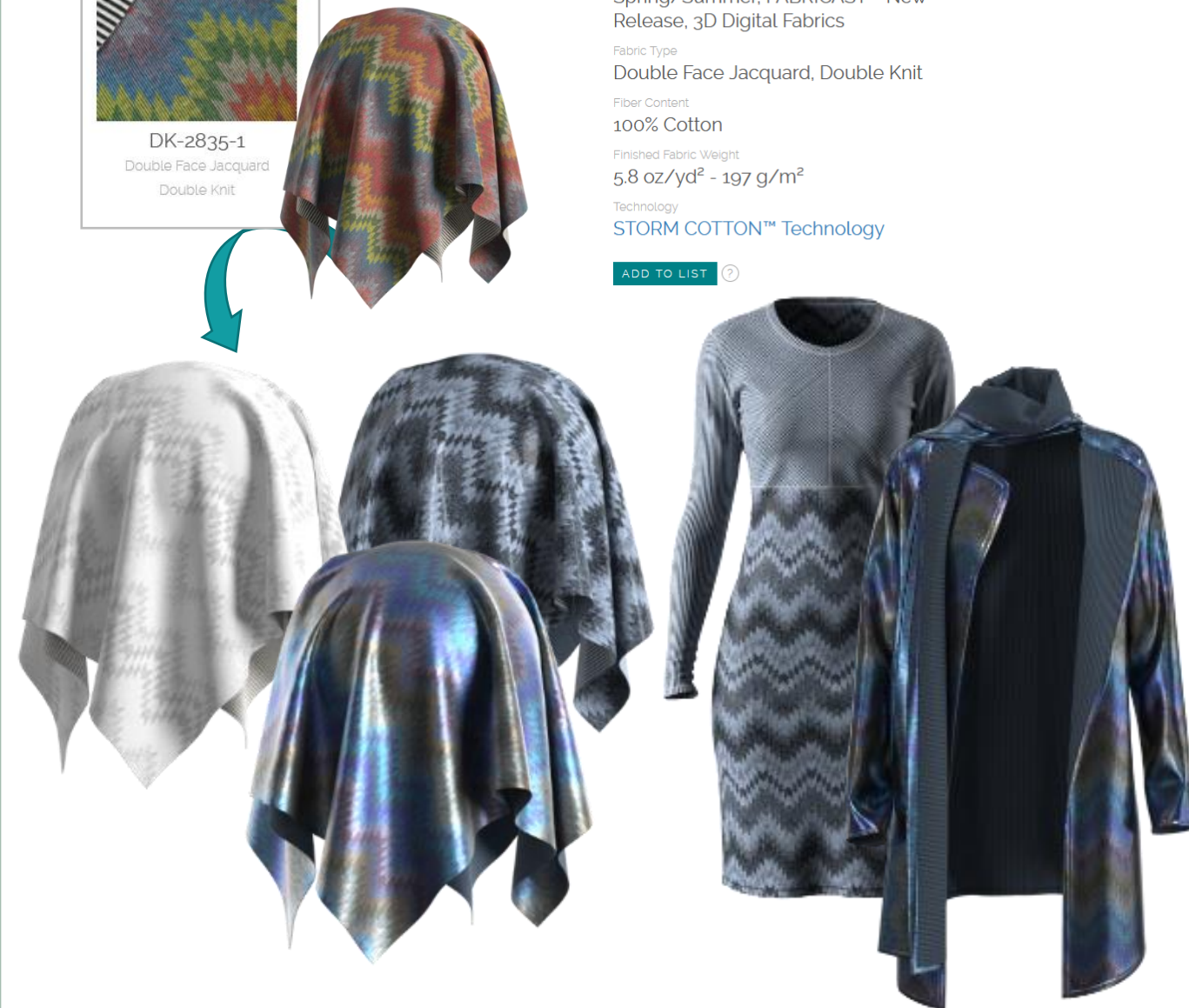
[ADD TO LIST](#) ⓘ



THE FUTURE OF COTTON **DIGITAL COTTON ADVANTAGE**

Digital fabrics allow users to create, iterate and reimagine our fabrics for their target customer.

cottonworks.com.



“As the first fiber to digitize at the source, cotton could now lead the way for a new model of digital material creation and use.”

D

— DIGITAL MATERIALS

Reborn Digital: Could Cotton Carve A Path For A New Generation Of Materials?

BY THE INTERLINE X COTTON INCORPORATED · AUGUST 3, 2020 · 7 MINUTE READ

As the material most synonymous with fashion's history, cotton's future could herald a fundamental shift in the industry's approach to digital materials.

Okay, designers are influenced by trends in color and fabric, but WHY do companies choose or NOT choose cotton fiber?

Supplier A

Chipped, some short some long, points and no points, erasers and no erasers

3-15% of pencils in each box are unusable

Price varies daily



Supplier B

All pencils are the same

100% of pencils in each box are usable

Price is consistent for months - HALF the price of supplier A!



Okay, designers are influenced by trends in color and fabric, but WHY do companies choose or NOT choose cotton fiber?

Cotton

Chipped, some short
some long, points and no
points, erasers and no
erasers

3-15% of pencils in each
box are unusable

Price varies daily



Synthetics

All pencils are the same

100% of pencils in each
box are usable

Price is consistent for
months - HALF the price
of supplier A!



Six Channel Polyester Fiber Cross Section



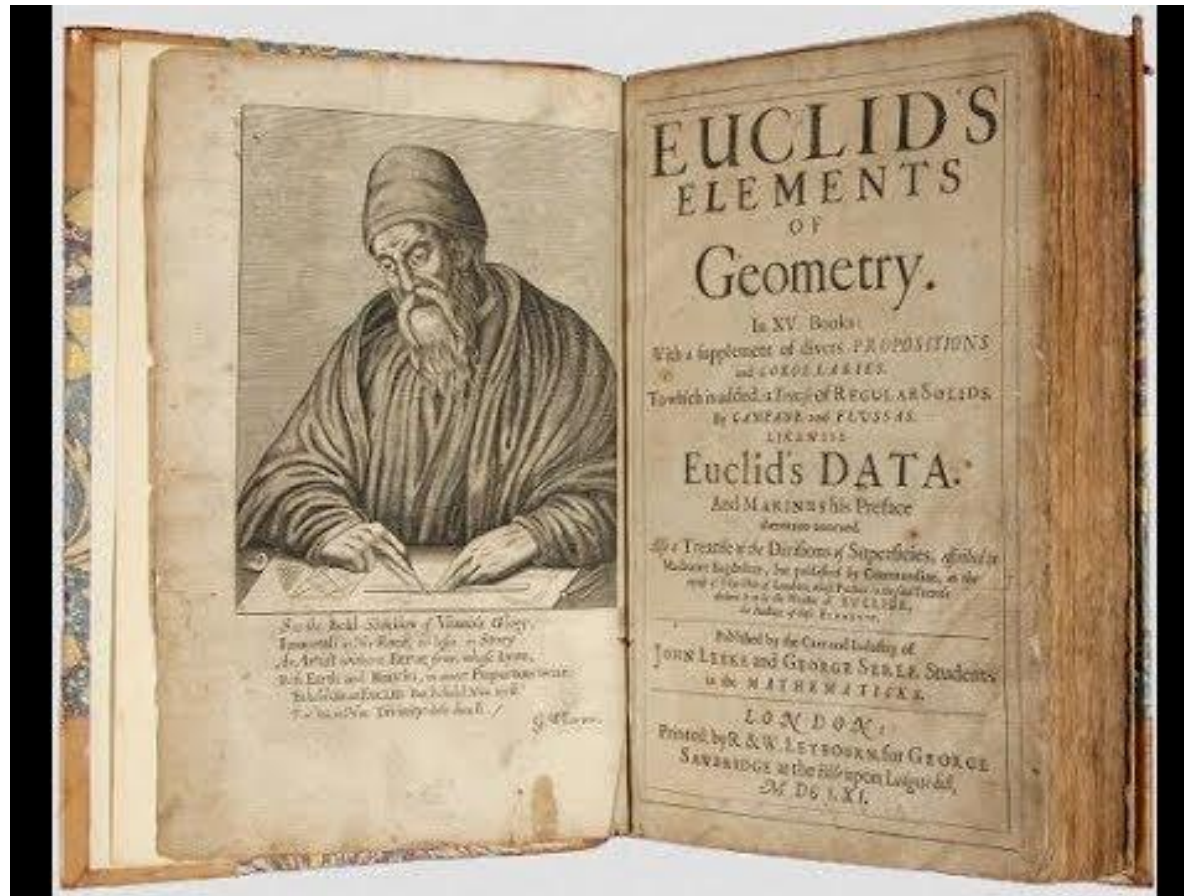
Okay, designers are influenced by trends in color and fabric, but WHY do companies choose or NOT choose cotton fiber?

Cotton

A natural fiber...

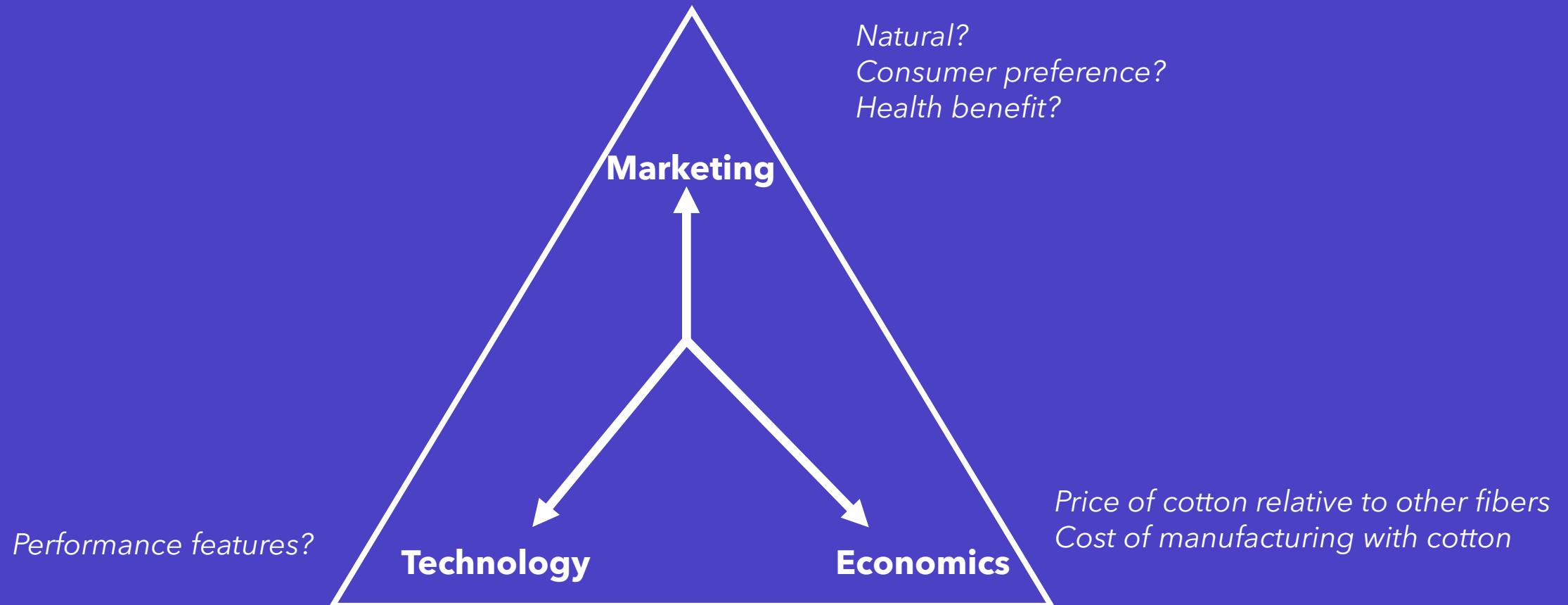
...but not a natural choice.

Okay, designers are influenced by trends in color and fabric, but **WHY** do companies choose or **NOT** choose cotton fiber?



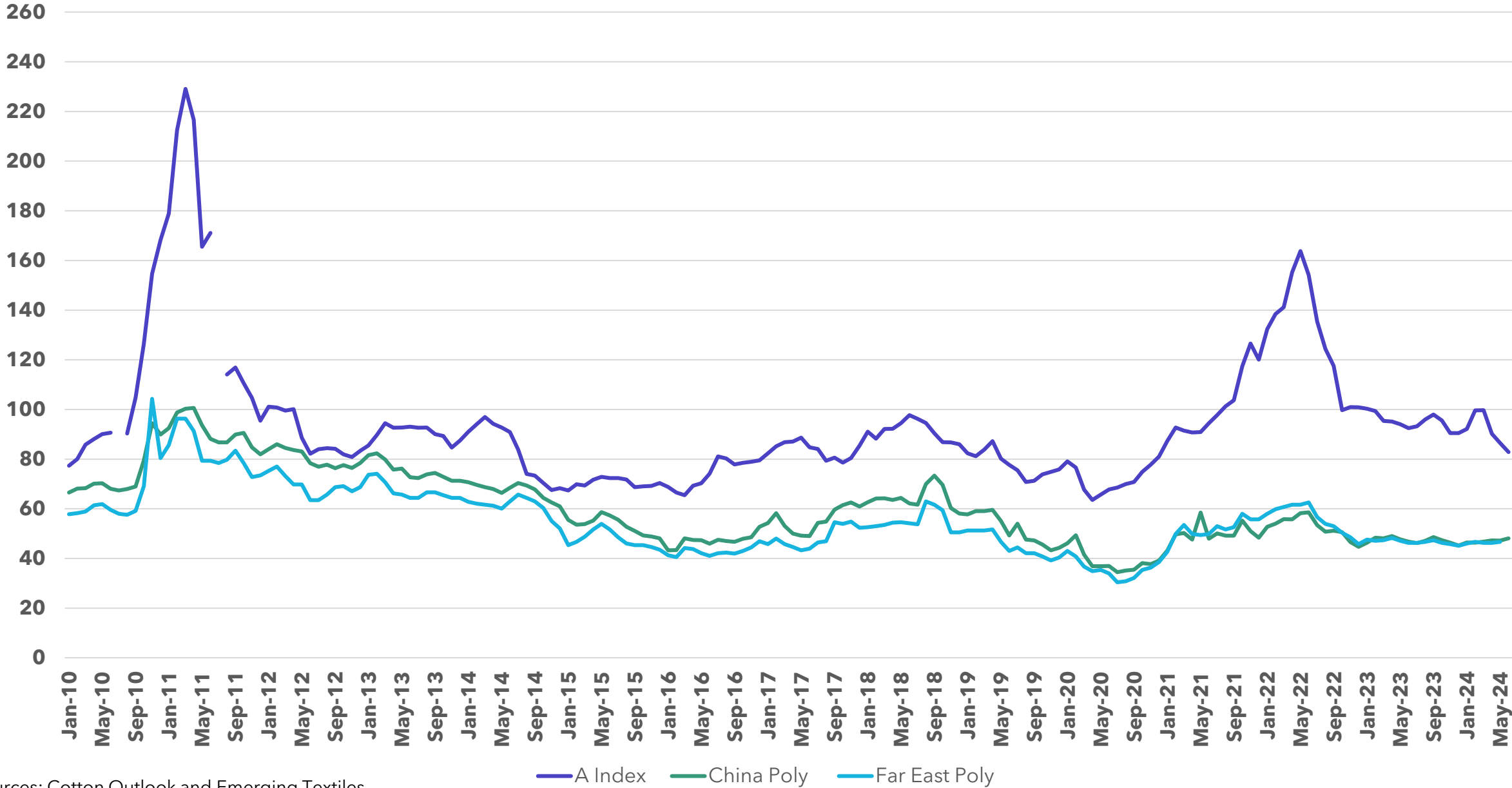
The Fiber Decision Process for Brands, Retailers, and Manufacturers

Which fiber should I use in a product?



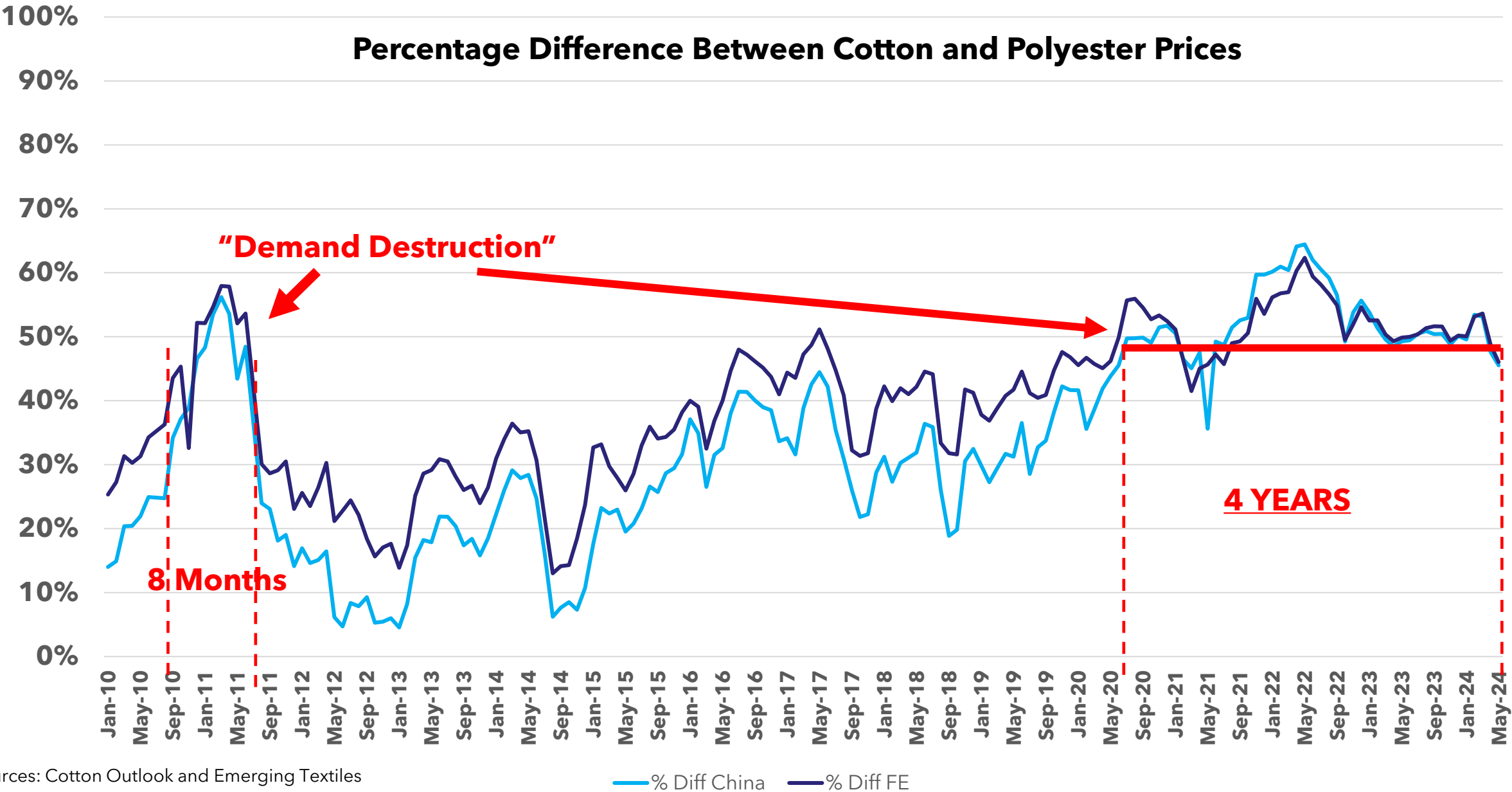
Cotton and Polyester Prices

Cents / lb



Sources: Cotton Outlook and Emerging Textiles

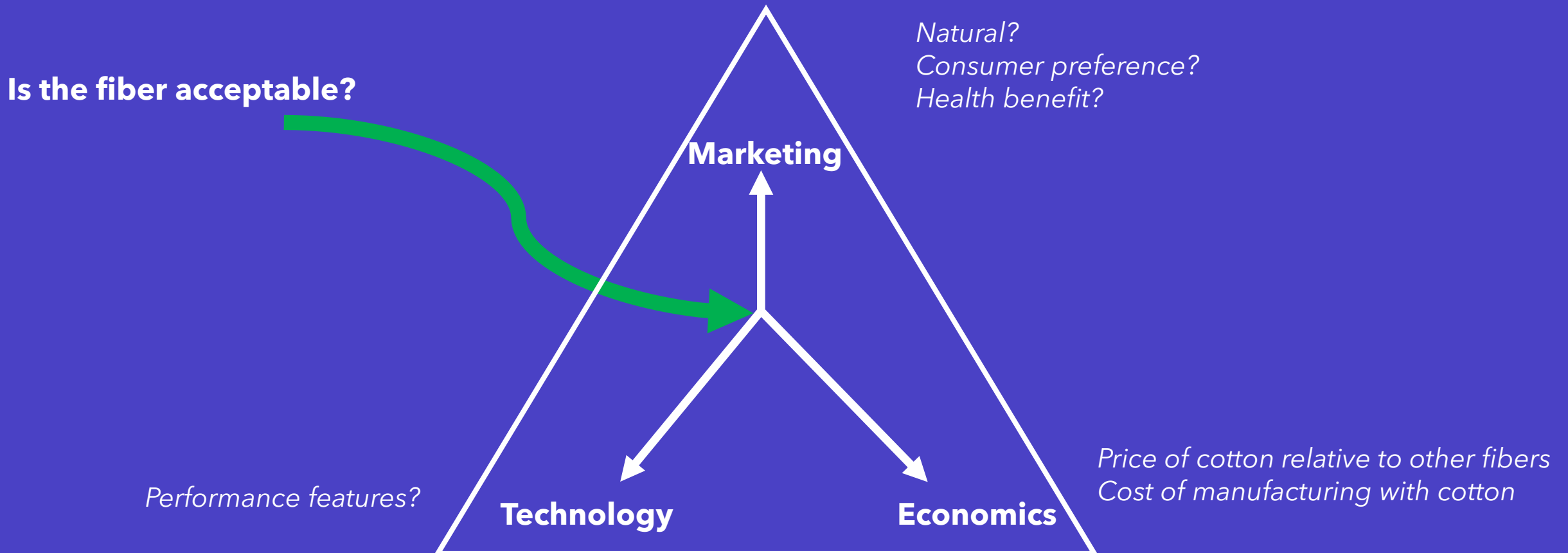
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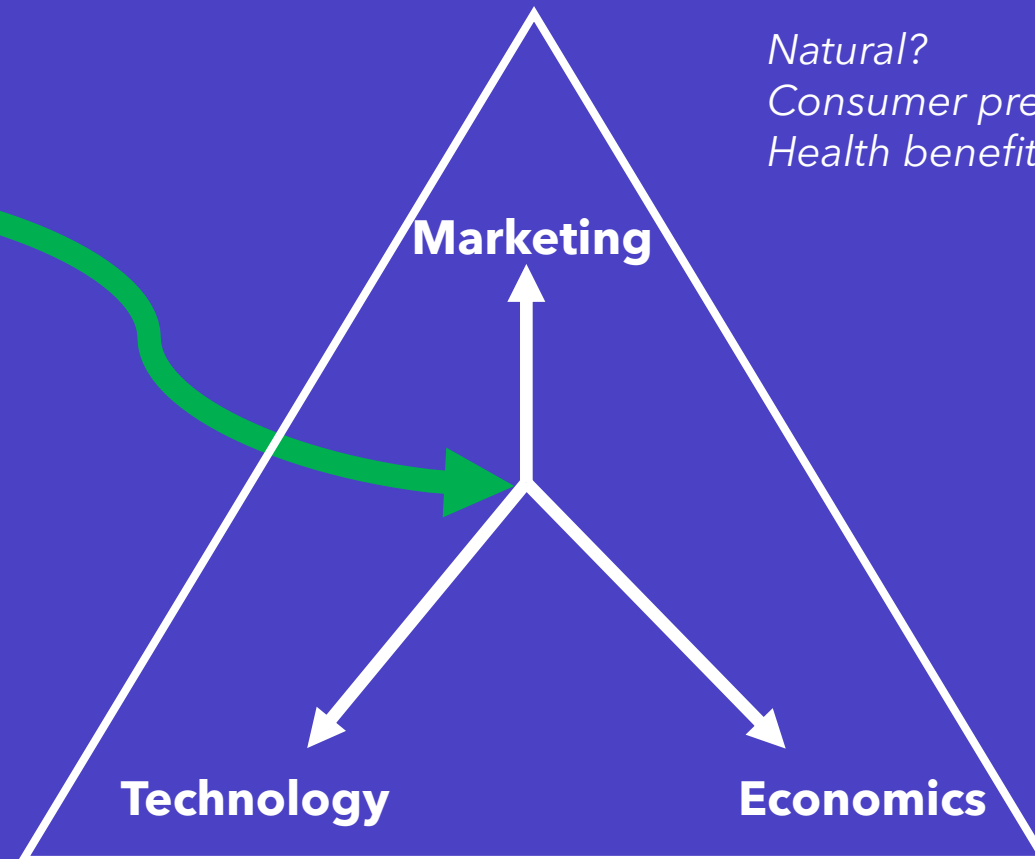
The Fiber Decision Process for Brands, Retailers, and Manufacturers

Which fiber should I use in a product?

Is the fiber acceptable?

- ☐ Sustainability
 - Circularity
 - Recycling
 - Biodegradability

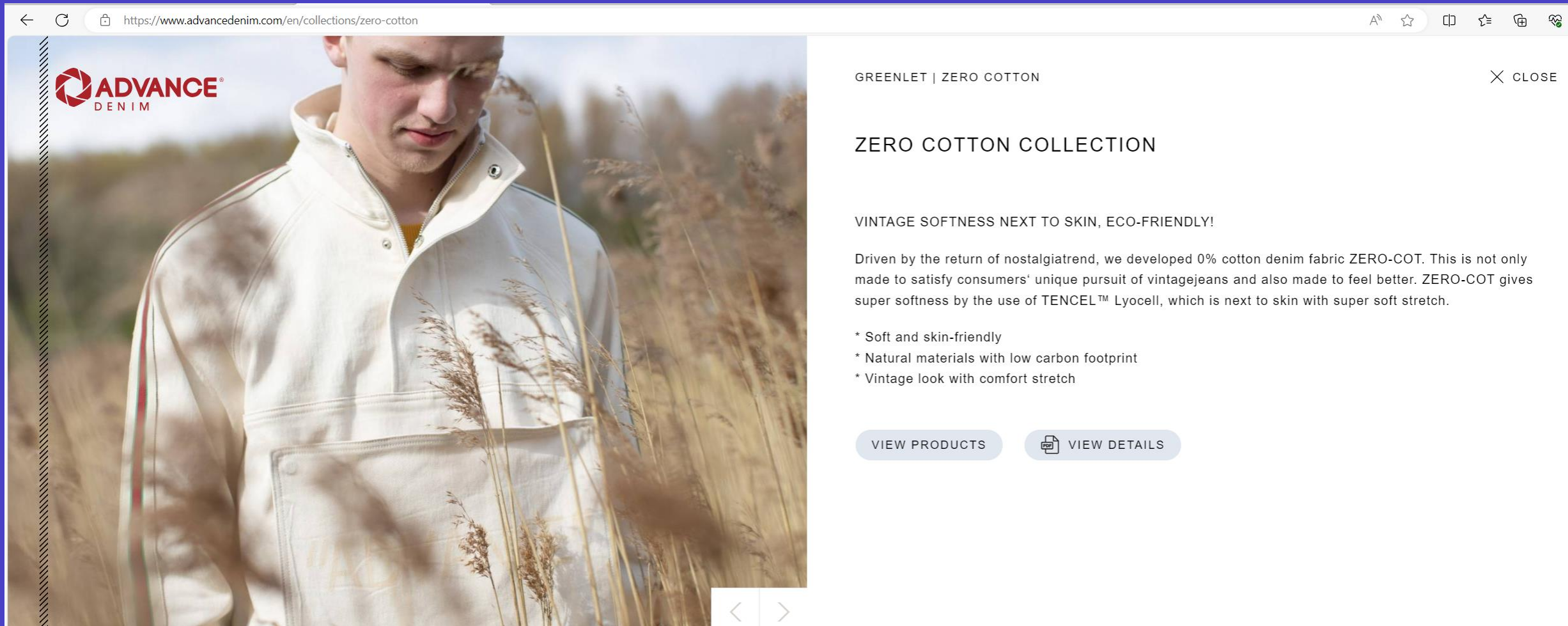
Performance features?



*Natural?
Consumer preference?
Health benefit?*

*Price of cotton relative to other fibers
Cost of manufacturing with cotton*

The Sustainability Challenge is a Challenge to Cotton's Use in Products



The screenshot displays a web browser window with the URL <https://www.advancedenim.com/en/collections/zero-cotton>. The page features a large image of a man in a white denim jacket standing in a field of tall grass. The 'ADVANCE DENIM' logo is in the top left corner. The page title is 'GREENLET | ZERO COTTON' with a 'CLOSE' button. The main heading is 'ZERO COTTON COLLECTION'. The text describes the collection as 'VINTAGE SOFTNESS NEXT TO SKIN, ECO-FRIENDLY!' and explains that it is made of 0% cotton denim fabric (ZERO-COT) using TENCEL™ Lyocell for softness and stretch. A list of features includes: soft and skin-friendly, natural materials with low carbon footprint, and a vintage look with comfort stretch. At the bottom, there are two buttons: 'VIEW PRODUCTS' and 'VIEW DETAILS'.

ADVANCE DENIM

GREENLET | ZERO COTTON

ZERO COTTON COLLECTION

VINTAGE SOFTNESS NEXT TO SKIN, ECO-FRIENDLY!

Driven by the return of nostalgiatrend, we developed 0% cotton denim fabric ZERO-COT. This is not only made to satisfy consumers' unique pursuit of vintagejeans and also made to feel better. ZERO-COT gives super softness by the use of TENCEL™ Lyocell, which is next to skin with super soft stretch.

- * Soft and skin-friendly
- * Natural materials with low carbon footprint
- * Vintage look with comfort stretch

VIEW PRODUCTS VIEW DETAILS

The Fiber Decision Process for Brands, Retailers, and Manufacturers

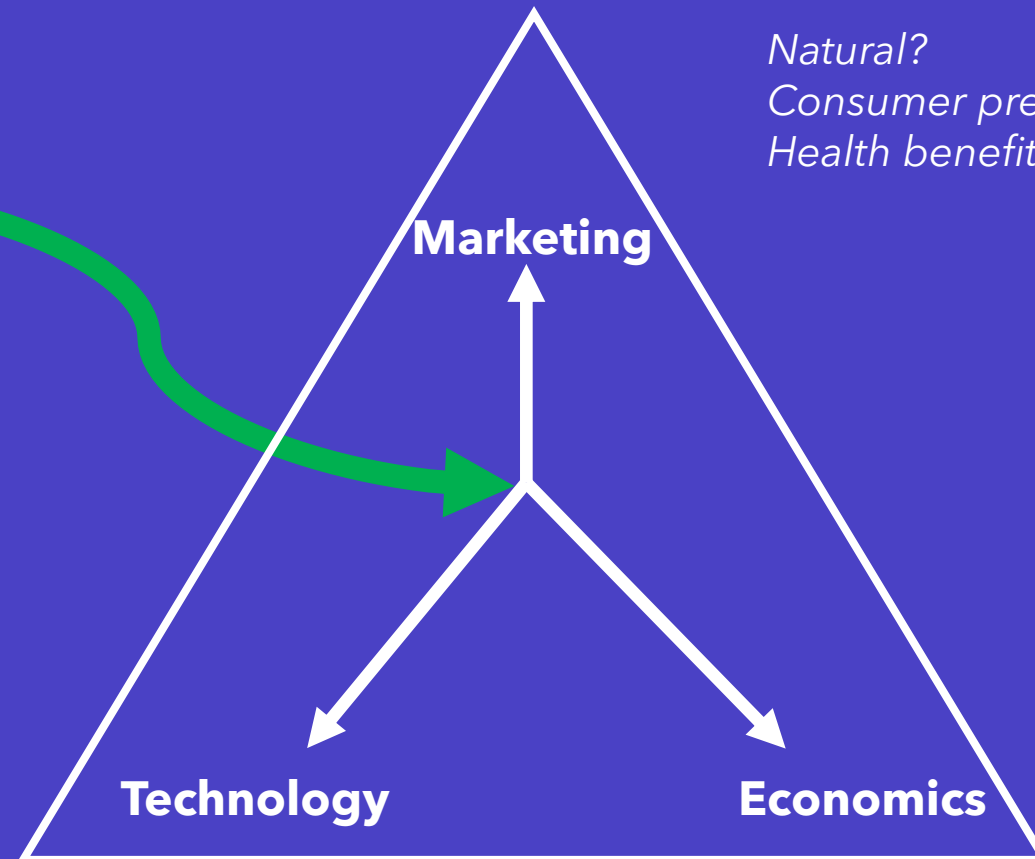
Which fiber should I use in a product?

Is the fiber acceptable?

- ☐ Sustainability
 - Circularity
 - Recycling
 - Biodegradability
- ☐ Traceability
 - Xinjiang
 - National Origin



Performance features?



*Natural?
Consumer preference?
Health benefit?*

*Price of cotton relative to other fibers
Cost of manufacturing with cotton*

Addressing Sustainability through Education and Farm Tours



"Being able to physically tour and see the farms, meet the farmers, hear directly from the staff and people in the industry. Great to hear the science behind everything."



Educate the Educators



- Fashion Institute of Design and Merchandising
- University of California at Pomona
- North Carolina State University
- Savannah College of Art and Design
- Colorado State University
- Kent State University
- University of North Texas
- Thomas Jefferson University
- University of Kentucky
- University of Arkansas
- State University of New York at Oneonta
- University of North Carolina at Greensboro

HUMANS & SOCIETY

Fuzzy definitions mar social science

A lack of conceptual clarity impedes research progress

BY SUJATA GUPTA

U.S. millennials are rejecting suburbia and moving back to the city. That was a theory I stumbled across in 2019, when I started as the social sciences reporter at *Science News*. But when I dug into a possible story on the phenomenon, I found an incoherent mess. Some research showed that suburbs were growing, others that suburbs were shrinking. Yet others showed growth in both suburbs and cities.

Unable to make sense of that maze of findings, I shelved the story. Several months later, I discovered a Harvard University white paper explaining that the disagreement stems from competing definitions of what distinguishes a city from a suburb. Some researchers define the suburbs as areas falling outside census-designated cities. Others look only for markers of suburbanism, such as a wealth of single-family houses and car-based commutes, the researchers explained.

I have encountered this type of fuzziness around definitions of all sorts of terms and concepts in the social sciences. Sometimes researchers simply assume that their definition of a key concept is the definition. Or they nod briefly at other definitions, and then go forth with whichever one they choose, without much explanation of why. Other times, researchers in one subfield choose one definition, and researchers in another subfield choose a different one—each without ever knowing of the other's existence.

"If you look...you will find this morass of definitions and measurements" in the social sciences, says quantitative psychologist Jessica Flake of McGill University in Montreal. My experience was a common one, she assured me.

Definitional morasses exist in other scientific fields too. Biologists frequently disagree about how best to define the term "species" (SN: 11/11/17, p. 22). Virologists squabble over what counts as "alive" when it comes to viruses. And not all astronomers are happy with the

decision to define "planet" in a way that leaves Pluto out in the cold as a mere dwarf planet (SN: 8/28/21, p. 20).

But the social sciences have some special challenges, Flake says. The field is a youngster compared with a discipline like astronomy, so has had less time to sort out its definitions. And social science concepts are often inherently subjective. Describing abstract ideas like motivation or feelings can be squishier than describing, say, a meteorite.

It's tempting to assume, as I did initially, that a single, imperfect definition for individual concepts is preferable to this definitional cacophony. And some researchers encourage this approach. "While no suburban definition will be perfect, standardization would increase understanding of how suburban studies relate to each other," the Harvard researchers wrote in that suburbia paper.

But a recent study taking aim at how we define the middle class showed me how alternative definitions can lead to a shift in perspective.

While most researchers use income as a proxy for social class, these researchers used people's buying patterns. That revealed that a fraction of people who appear middle class by income struggle to pay for basic necessities, such as housing, child care and groceries, the team reported August 23 in *Social Indicators Research*. That is, they live as if they are working class.

What's more, that vulnerable group skews Black and Hispanic, a disparity that arises, in part, because these families of color often lack the generational wealth of white families, says study coauthor Melissa Haller, a geographer at Binghamton University in New York. So when calamity strikes, families without that financial cushion can struggle to recover. Yet a government or nonprofit organization looking to direct aid toward

the neediest families, and relying solely on income-based metrics, would overlook this vulnerable group.

"Depending on what definition you start with, you will see different facts," says Anna Alexandrova, a philosopher of science at the University of Cambridge. A standardized definition of middle class, for example, could obscure some of those key facts.

In the social sciences, what's needed instead of conceptual unity, Alexandrova says, is conceptual clarity.

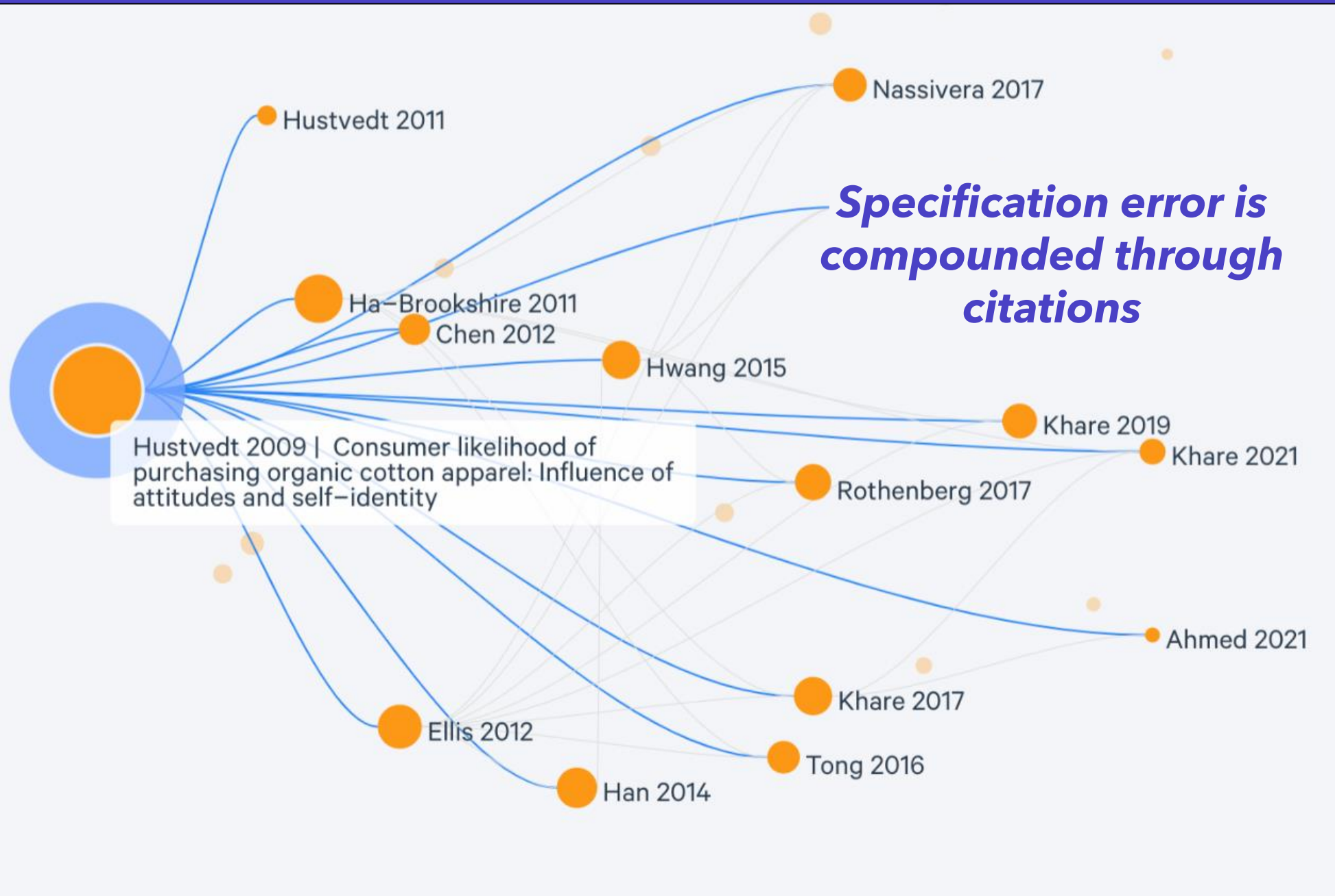
Though social scientists disagree about how to go about solving this problem of clarity, Flake says, failure to tackle the issue jeopardizes the field as much as other crises rocking the discipline, such as concerns over reproducibility. That's because how a topic is defined determines the scales, surveys and other instruments used to study that concept. That in turn shapes how researchers crunch numbers and arrive at conclusions.

Defining key terms and then selecting the right tool is usually straightforward when relying on large, external datasets. For instance, instead of using national income databases, as is common in the study of the middle class, Haller and her team turned to the federal government's Consumer Expenditure Surveys to understand people's daily and emergency purchases.

But often social scientists, particularly psychologists, develop their own scales and surveys to quantify subjective concepts, such as self-esteem, well-being or mood. Definitions of those terms—and the instruments used to study them—can take on a life of their own, Flake says.

In the May-June *American Psychologist*, she and colleagues showed how this process plays out. They combed through the 100 original studies and 100 replications included in a massive reproducibility project in psychology. The team zoomed in on 97 multi-item scales—measuring concepts such as gratitude, motivation and self-esteem—used in the original and replication studies, and found that 54 of those scales had no citations to

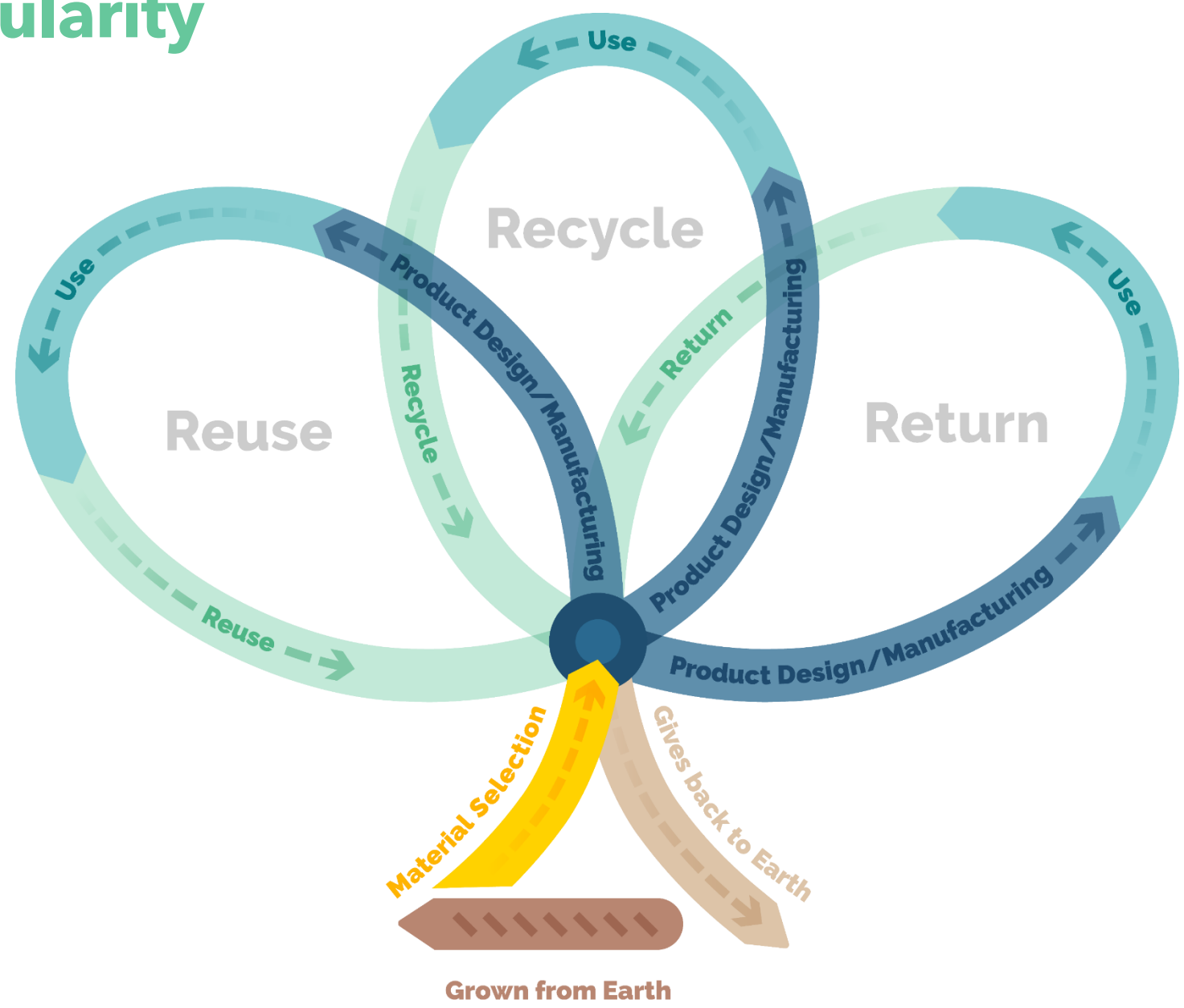
"...how a topic is defined determines the scales, surveys and other instruments used to study that concept. That in turn shapes how researchers crunch numbers and arrive at conclusions."



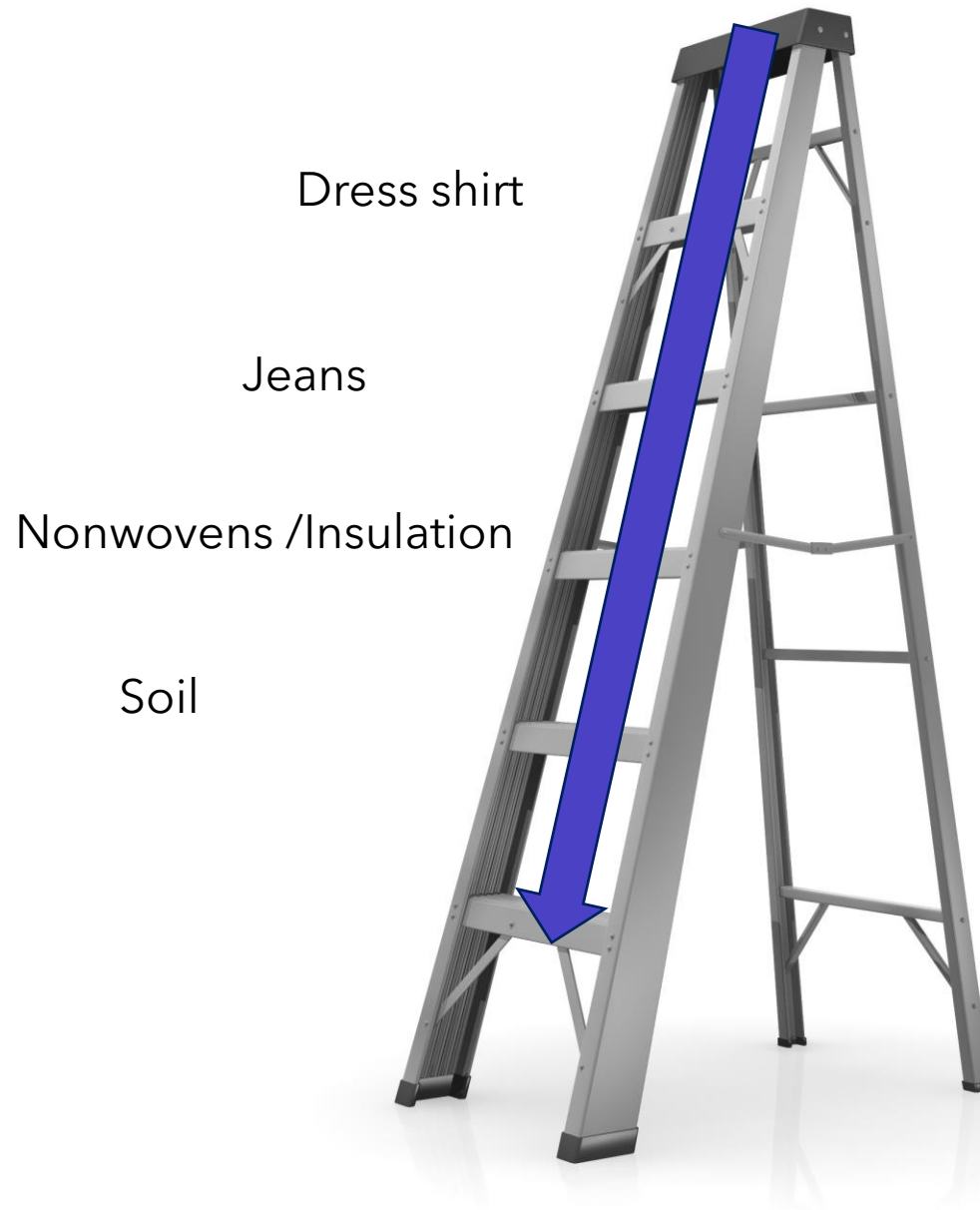
Educate the Emerging Professionals



Cotton Circularity



Recycling cotton textiles is a “laddering down” process



- Lateral moves are very limited
- Fiber quality degrades
- Yarn quality compromised
- Fabric quality compromised

Using technology to influence the use of cotton in products





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Sale



Versa Standard Pullover Hoodie

★★★★★ (25)

~~\$75.00~~ \$59.95

Color: Black/Checkerboard



Size

[Size Guide](#)

XS

S

M

L

XL

XXL

Extras

[HOME](#) | [MEN'S](#) | [LAST CHANCE](#) | [STORM FULL ZIP](#)

DON'T LET THE WEATHER SLOW YOU DOWN

STORM FULL ZIP

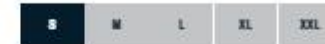
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★★★★☆ 487 REVIEWS

COLOR: DUSK



SIZE: SMALL

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Free shipping on orders \$100+



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DESCRIPTION

We started with the Classic Full Zip, called "The Greatest Hoodie Ever Made." Then we evolved it for wetter weather. The Storm Full Zip has features like heavyweight water repellent fabric, scuba hood, and zippered pockets to keep you warm and dry.

DETAILS

SIZING

CARE



TOUGH COTTON™

Girls' Unicorn Print Leggings - Cat & Jack™ Heather Gray XS

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Save 20% with code **KIDS20** on kids' graphic tees and leggings [offer details](#)

★★★★★ 79

Size

XS	S	M	L
	XL	XXL	

Quantity: 1

Shipping to 11590

Add to cart

Get it by **Tue, Oct 30** with free 2-day shipping on \$35 orders

This delivery date includes extra time for the weekend.

Free order pickup

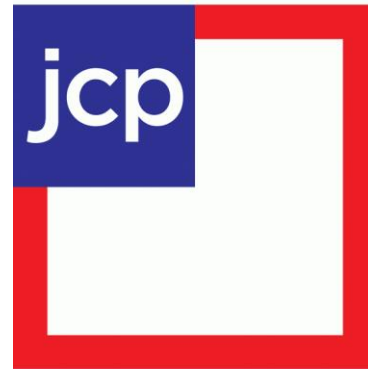
only 4 left

Get it today at Westbury ?

Add to cart

Check other stores

Aisle P33



56
million
units

>\$ 11 million
raw cotton sales*

*Estimated at 1200 units/bale (480 lbs) and 50 cts/lb price

Getting Cotton into Apparel

TOUGH
COTTON™

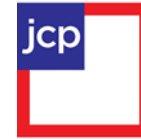
WOLVERINE 



DULUTH
TRADING
CO



Walmart 



Markets for Cotton Fiber





RESTech COTTON™ Technology

AVAILABLE WITH OR WITHOUT RESIN



RESTech COTTON

I WILL SAY NO TO PLASTIC'S BIG 4



BOTTLES



BAGS



STRAWS



CUPS



I WILL SAY NO TO PLASTIC'S BIG 4



BOTTLES



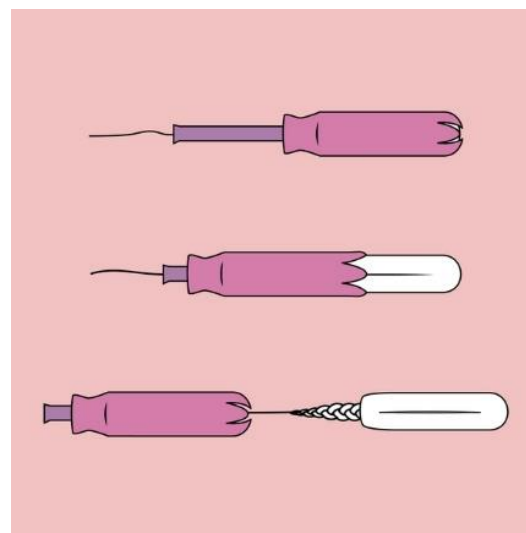
BAGS



STRAWS



CUPS

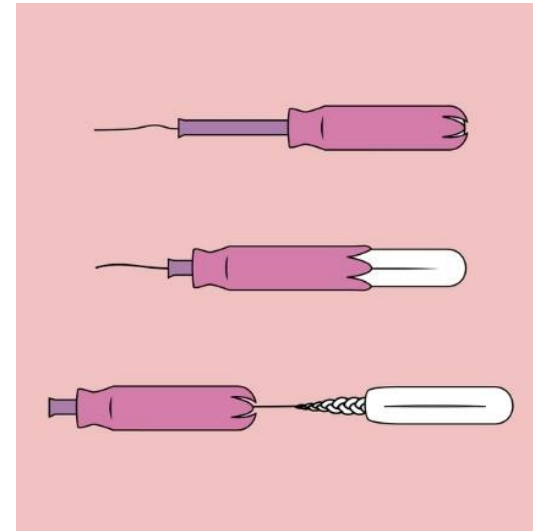


Opportunities for Cotton

Trend toward Reusables

Diapers and pads

Period Products



Cotton Product Opportunities



NONWOVENS
INDUSTRY SINCE 1970

MAGAZINE NEWS EXCLUSIVES APPLICATIONS TECHNOLOGY

BREAKING NEWS

Nike Introduces Period Shorts

One Leak Protection is available in Nike One Short silhouette



06.14.23



In April, **Nike** introduced the One Leak Protection: Period Short, which is available in the Nike One Short silhouette. The shorts feature Nike Leak Protection: Period, an ultrathin, absorbent liner that helps protect against period leaks, to help expand sport and movement for the next generation, so teens and adults can continue doing what they enjoy with peace of mind.

The proprietary material technology went through significant validation and wear testing, creating a new Nike-innovation-backed solution to provide added protection. Nike designers created and tested more than 30 prototypes to find the just-right fit for movement and comfort.

"Fear of bleed-through is real — and not just through the teen years, but through the entire journey of menstruation," says Lisa Gibson, Senior Project Manager, Nike Apparel Innovation, and a key player in developing this new innovation. "Nike Leak Protection: Period is for people with periods across all life stages, designed to give them an added layer of confidence so they can feel secure during all forms of sport and movement. It's an innovation that we believe will



Beyond Breeding: Downstream Challenges for Getting Cotton into Products



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Senior Vice President, Global Supply Chain Marketing

Cotton Incorporated

cotton can
return to the earth

Help meet your sustainable sourcing goals while reducing waste. With more ways to reuse and recycle¹, cotton is a naturally circular choice. It can even degrade in compost², making it so the cycle of growth and renewal can begin again. What will you create?

[Get inspired at CottonWorks.com](https://www.cottoninc.com/cottonworks)

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1. Cotton products are recyclable only in a few communities that have appropriate recycling facilities. 2. In composting tests, cotton fabric samples underwent a weight loss of approximately 50-77% after 90 days in a composting facility. L.L. Lili; Frey, Margaret; Browning, Kristie (2020). Biodegradability study on cotton and polyester fabrics. *Journal of Engineered Fiber and Fabrics*, 5(4): 42-53.