FROM SYNTHETIC TO SUSTAINABLE: A GUIDE FOR SOFT GOODS SPECIFIERS

IN SUPPORT OF MASD THESIS REVIEW
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Kelsey Lee Nelsen Barajas

Thesis Advisor | Holly Robbins
Thesis Committee Members | Shanna Ruyle & Ellie Cotlar
Thesis Committee Chair | Dawn Keene

Abstract

This thesis addresses the need for soft goods materials specifiers to shift from using synthetic materials by developing actionable solutions for change. This project incorporates design thinking and systems thinking along with independent research on ESG reporting, interviews, and a survey specific to specifiers to gather both qualitative and quantitative data. This research asserts that polyester is an unsustainable material that spreads and persists as microplastics in the biosphere causing harm to all stakeholders, including the planet itself.

An actionable guide is the proposed process to implement change for specific case-by-case decision making in soft goods product design. This plan encourages specifiers to leverage their network, utilize data, and incorporate The Natural Step framework into their decision-making process. An additional persuasive presentation provides an outreach tool.

Table of Contents

INTRODUCTION

Microplastics Are Everywhere

DEFINING THE PROBLEM

Microplastics are particles containing a solid polymer that is 1 µm to 5 mm long with a length to diameter ratio greater than 100.[1]

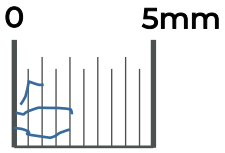

Figure 1: Microplastics at 100% scale

Microplastics are building up in the world's oceans and other biomes. These tiny pieces of synthetic material come from degraded plastic from a variety of human-made sources including textiles. Emerging research from the past decade has put a spotlight on microplastics from clothing, specifically found in waterways by way of laundering. **Microplastics are everywhere.**

There is still much researchers and industry leaders do not know regarding microplastics in our environment: how they affect human health, ecosystems, the climate. Despite the widespread nature of the problem and growing awareness, industry and policy response has been incredibly slow. At the time of this writing, there are few regulations on microplastics, standardized tests for water or soil toxicity due to microplastics, and limited research on the impacts of these minuscule fibers.

It is estimated that between the years 2000 and 2015, the production of textiles almost doubled. If trend continues, **consumption of apparel and accessories will increase by 63% by 2030.**[2] Additionally, in 2021 polyester made up 54% of global total fiber production suggesting that production continues to rise.[3] These concerns are compounded by the lack of regulation and the persistence of these fibers in the biosphere.

PROBLEM STATEMENT

Synthetic textiles from the fashion industry have contributed to increasing levels of pollution in the global ecosystem in recent decades. Although polyester is widely viewed as problematic, its use in soft goods has continued to rise.

Microplastics from synthetic textiles, predominantly polyester fibers, are not only found in our waterways, but they are also in our soil, food, the air we breathe, and in our bodies.[4]

Figure 2: A simplified process map of the extraction, production, use, and eventual introduction of microplastics into the biosphere.

Microplastics In The Biosphere

ECOSYSTEM DISRUPTION

Microplastics in Waterways

Microplastics have been consumed by a wide variety of sea life including whales, mussels, fish, and sea birds. Blue whales, which rely on consumption of krill, may consume upwards of 10 million microplastic particles every day as they ingest large swaths of water.[5] Not only are microfibers consumed through direct ingestion like in blue whales, but others through *trophic transfer*, the consumption of another animal.

35% OF MICROPLASTIC POLLUTION IN THE OCEAN IS DERIVED FROM THE TEXTILE INDUSTRY[6]

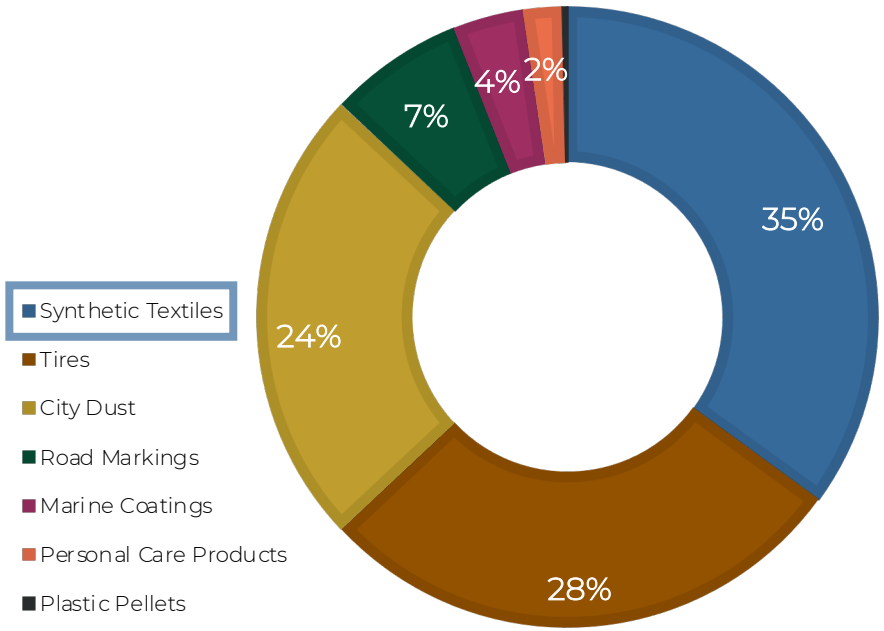

Figure 3: A chart showing the most common microplastic pollutants in the world's oceans.

THE EFFECTS OF MICROPLASTICS ON A TERRESTRIAL ENVIRONMENT

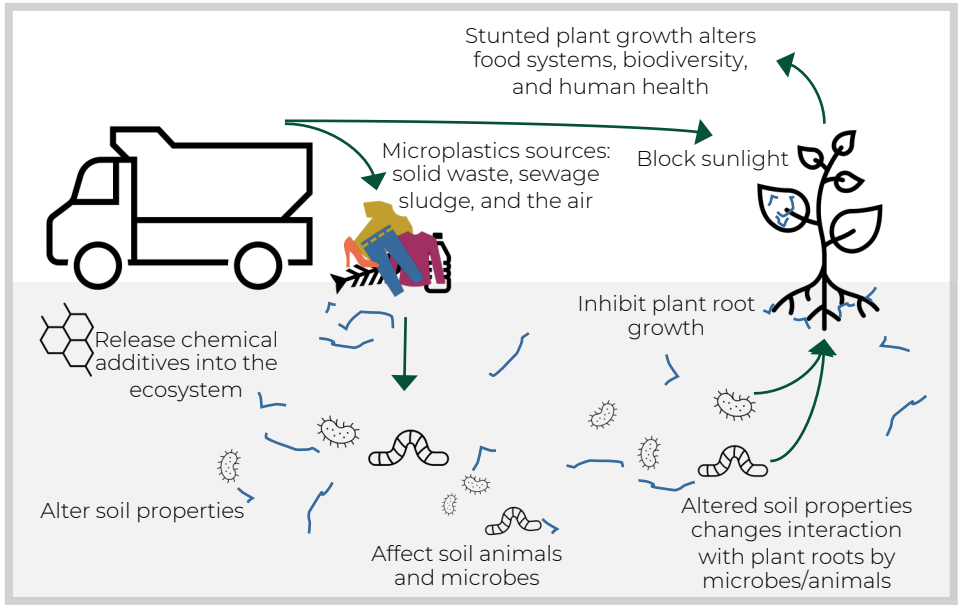

Figure 4: A graphic illustrating the impacts microplastics have on terrestrial health.[7]

Microplastics in Soil

In addition to the presence of microplastics in the ocean, microplastics are also widespread on land. A 2018 study in *Science Daily* found that the health of earthworms can be altered by the presence of microplastics in the soil, thus affecting soil properties and natural functions (see Figure 3).[8]

It is also important to note that microplastic pollution on land has been estimated to be between four and 23 times more than in our oceans.[9] Much of this comes from sewage, where 80-90% of particles found in sewage sludge can be attributed to microplastics from garment fibers. Sewage sludge is commonly used as fertilizer, thus a means for transferring microplastics directly into soils that grow crops and feed.

Environmental and Human Impact

MICROPLASTICS ARE A GLOBAL ISSUE

Microplastics in Humans

The extent of the harm caused by microplastics in humans is still unclear, but researchers estimate that the intake via a typical diet in the United States alone could equate up to 52,700-73,600 microfibers ingested annually.[10] This figure does not include the fibers inhaled from clothing, carpet, or other household textiles.

Studies have linked the ingestion of microplastics as a vector for other chemicals. However, as an emerging field of research, there is little definitive evidence that microfibers themselves cause disease in humans. Ultimately, more research is needed to address microfiber toxicity and impact. What is clear today is that microfibers degrade quality of life across ecosystems and food chains.

Figure 5: Akram Huseyn, December 17, 2021, Digital Photo, Unsplash, Baku, Azerbaijan, https://unsplash.com/photos/fKC9eWRnlGY

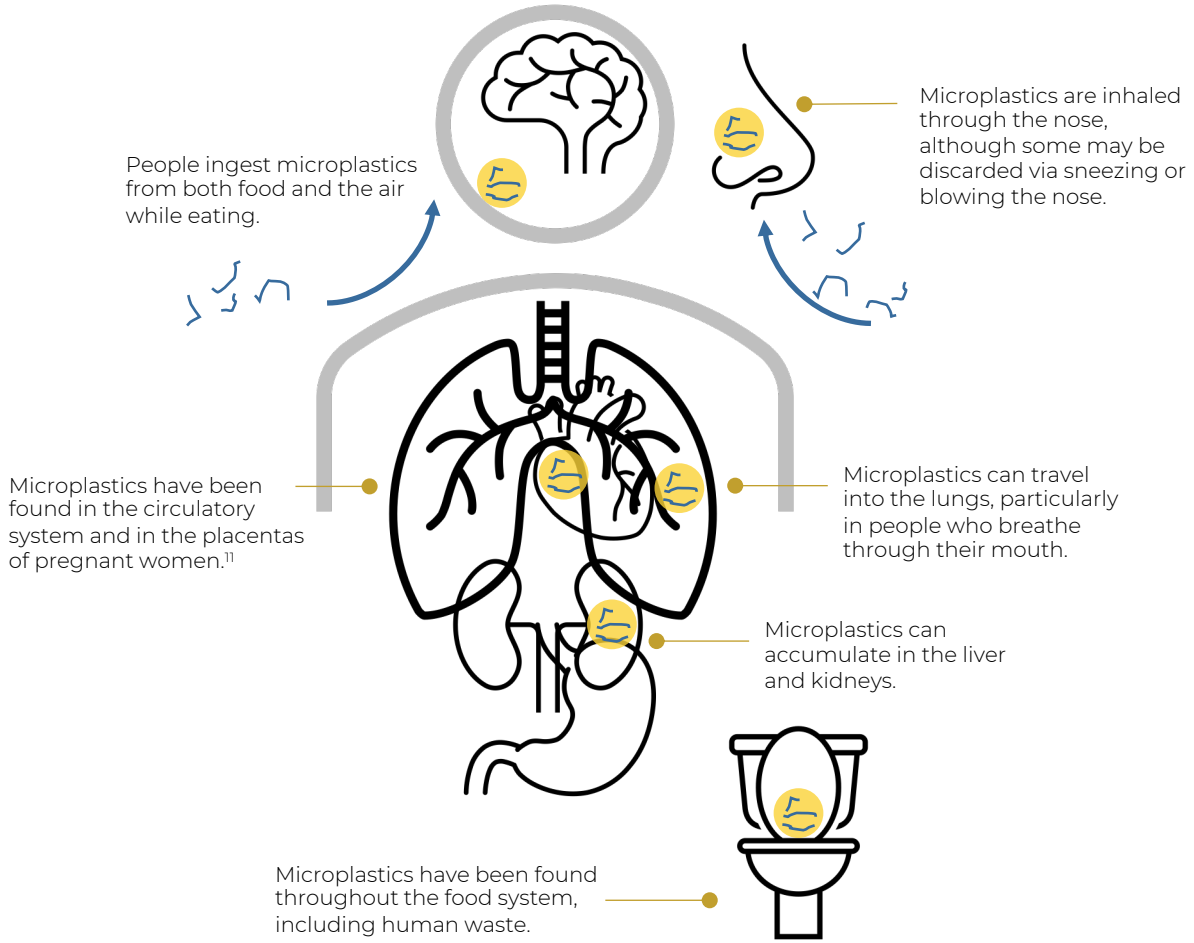

Figure 6: An illustration of microplastics passage in and through the human body.[12]

Specifiers Are Choosing Polyester; They Don't Have To

WHO ARE SPECIFIERS AND HOW CAN THEY HELP?

Specifiers are designers, product developers, materials engineers, materials scientists, brand owners or anyone who decides from what products are made. This group understands material characteristics that make them desirable for soft goods like clothing, shoes, and accessories. Collectively, the scientific and technical knowledge along with creative and collaborative thinking make this group influential stakeholders in the soft goods industry.

Specifiers are highly skilled yet are bound by the demand for quick production of low-cost products that have come from the rise in popularity of fast fashion. The constant push for lower quality, faster turnaround, and mass amounts of goods has resulted in a broken industry that exploits labor, raw materials, and the ecological boundaries of the biosphere. Brands and investors have become the beneficiaries of these increased, short-term profits, while consumers and the planet pay the price.

Specifiers strive to make quality products that consumers will use and appreciate for a long time. However, the popularity of fast fashion continues to grow, and the industry further loses sight of this promise.

THESIS STATEMENT

Empowering specifiers to transition from the reliance on synthetic fibers to regenerative, natural, or innovative and more sustainable fiber solutions can create an industry-wide shift to responsible design.

NEARLY 60% OF GLOBAL FIBER PRODUCTION IN 2020 WAS SYNTHETIC FIBERS. (MILLION TONNES)[13]

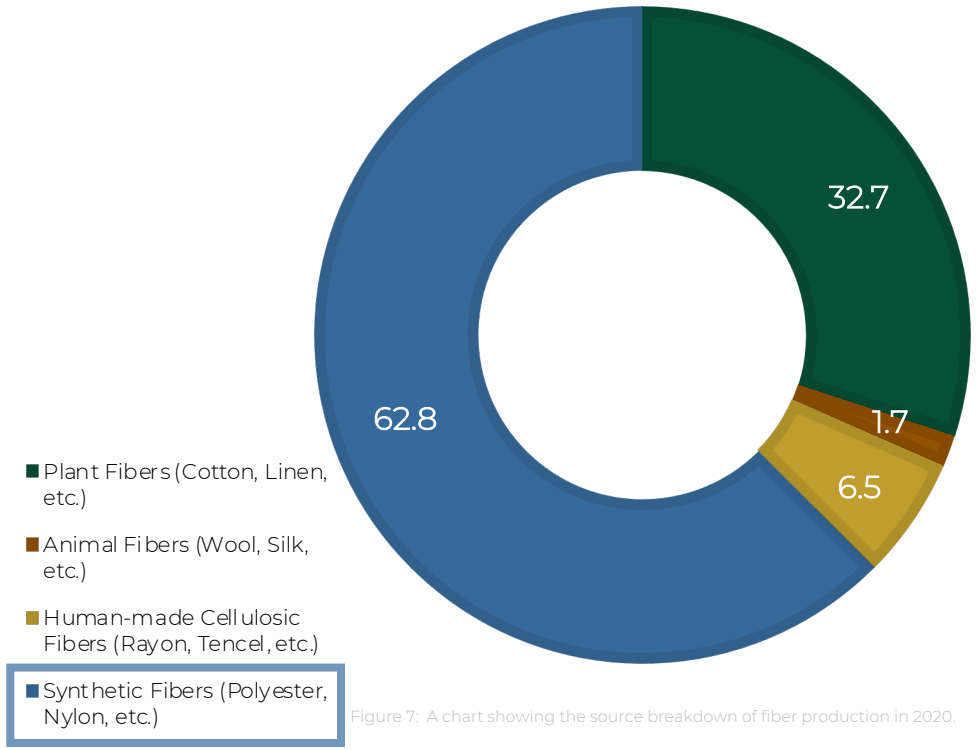

Figure 7: A chart showing the source breakdown of fiber production in 2020.

Current Solutions and Industry Leaders

PROBLEM-SOLVING ACROSS THE INDUSTRY

There are a range of organizations that offer solutions to mitigate the impacts of microplastic pollution from fast fashion. These organizations are important to the narrative, but the ultimate responsibility of material choices lies with the key decision-makers: specifiers, brand owners, and the soft goods industry leaders.

Solutions are presented every day, many of which target the problem downstream, placing responsibility on the consumer and the way clothes are cared for, laundered, and disposed. Laundry bags for clothing that trap microplastics, filter attachments for washing machines, and new high-tech washing machines are a few of the solutions. Recent legislation in California has moved one step closer to requiring all new machines to be outfit with microfiber filters by 2029.[14]

While innovative, these ideas do not target the main issue:
the use of synthetic fibers and additives resulting in the accumulation of microplastic pollution in the biosphere.

FASHION REVOLUTION	FIBERSHED	HXN HECHO POR NOSOTROS	ELLEN MACARTHUR FOUNDATION
Fashion Revolution *is a global fashion activism organization based in the United Kingdom that emphasizes equity and environmental impact.*[15]	Fibershed *based in the western United States focuses on land regeneration through equitable fiber and dye systems.*[16]	Hecho por Nosotros *focuses on sustainable practices through textile research in the camelid fiber value chain in South America.*[17]	Ellen MacArthur Foundation *promotes the Circular Economy through partnerships with businesses, academic institutions, and government.*[18]

Figure 8: Some of the leading organizations addressing the negative impacts of fast fashion.

Figure 9: Markus Spiske, August 29, 2020, Digital Photo, Unsplash, Nürnberg, Deutschland, https://unsplash.com/photos/mz5l5In8zxE

Analysis of Twelve ESG reports early in this research assessed the stance organizations were taking on microplastics. Of the companies reviewed:

- 50% mentioned microplastics in their reports at least once
- 25% of these organizations stated their membership in the Microfiber Consortium, but did not specify commitments of involvement with this organization
- 17% mentioned goals, targets, and/or methods to reduce the prevalence of microplastics

Based on the review of these ESG reports, microplastics are a concern to some organizations. But what is unclear is what these corporations are doing or intend to do to mitigate or eliminate the problem. For a brief overview of this analysis, see Appendix A.

Idea

Specifiers are the targeted audience for this thesis. Specifiers are the individuals and teams who make the decisions that impact the material composition of products available to consumers. Unfortunately, the full lifecycle of these materials is not often considered in the design process resulting in negative impacts on the biosphere.

A tool aiding specifiers to transition to more circular solutions will be delivered along with a persuasive presentation. This tool could teach specifiers more about materials, testing methods, and other sustainability issues.

> More than 80% of the ecological impacts of a product are determined in the design phase.[19]

Strategy

Research will focus on the Design Thinking approach, a process based on a human-centered approach to design.

The design for sustainability strategies used throughout this thesis are design for source reduction, design for systems change, and design for recyclability. These strategies will also include application of the Natural Step and systems thinking.

With the current environmental crisis and quickly rising costs in global markets, the goal of this research is threefold: to research the affects of using synthetic fibers, understand specifiers' motivations for their material choices, and create an actionable process that specifiers can follow to better understand the sustainability issues and to make better materials choices earlier in the design phase.

To begin, it will be important to understand the motivations behind specifiers' design decisions and material selection process. By first developing an understanding of the design process, this research will lead to a more robust knowledge of the problem, thus aiding in the deployment of actionable solutions. To better understand the issues and barriers facing specifiers, a survey and interviews will be conducted with a variety of industry professionals.

Impact

Over the last three decades, the fast fashion industry has contributed to massive amounts of pollution and has shifted the way consumers think about clothing now, treating clothing as disposable. Specifiers are designing garments that don't last, instead they have become another single-use item destined for the landfill.

Impact can be measured through a variety of metrics such as materials testing methods, key performance indicators (KPI's) within an organization, and the longevity and useful life of a product. Specifying bio-based or natural fibers may set the fashion industry on the path to becoming circular and regain integrity in the global marketplace.

While brands acknowledge the issue, they are not necessarily committing to phasing out polyester or dramatically decreasing its use. Providing transition tools may help the industry embrace this goal.

Scope

This project will focus on the need to shift toward sustainable solutions in the place of synthetic fibers like polyester.

This research will focus on the following:

- Specifiers in the soft goods industry
- Organizations of all sizes
- Barriers to specifying more responsible materials

This research will not address:

- Government policy or legislation
- Textiles manufactured outside of the soft goods industry
- Natural fibers with synthetic dyes and finishes

The goal is to encourage and motivate specifiers to make material choices based on fiber lifecycle, product impacts, and designing for circularity.

Figure 10: Ethan Bodner, August 18, 2018, Digital Photo, Unsplash, Connecticut, USA, https://unsplash.com/photos/kgC99X3WH1w

Figure 11: Content Pixie, July 30, 2019, Digital Photo, Unsplash, https://unsplash.com/photos/l6I8jpzKJQU

Professional Goals

This author plans to lead sustainability initiatives in the soft goods industry, focusing on material impacts, diving deeper into innovative materials, regenerative natural fibers, and working to build stronger connections within the value chain. A passion for textiles and fiber systems, a foundation in systems thinking and the sustainable design frameworks, and the increasingly concerning microplastics problem motivate this researcher to continue to explore solutions and systems change.

This researcher would like to find a role supporting and educating designers to make more responsible materials choices. Additionally, the author plans to continue to evolve and improve the project outcome and to make better materials solutions available and accessible at scale.

A long-term goal for this author is to explore regenerative agriculture and fiber farming on a small alpaca farm of her own. This farm will serve as a platform for education, with an emphasis on care and connectedness with each other and the environment.

EXECUTION

Design Thinking In Action

PROJECT DISCOVERY

Initial Process

Preliminary research was focused on determining knowledge gaps to responsible materials specification in the design process. It was assumed that specifiers lacked education to make informed decisions regarding the harm caused by synthetic materials, especially those leading to microplastic pollution like polyester.

To identify areas of intervention and propose a solution, the following techniques were applied: design thinking, brainstorming tools like mind mapping and list making, conducting specifier interviews, developing a survey for industry professionals, and applying sustainable design frameworks like the Natural Step and Life's Principles from Biomimicry.

Process Evolved

Research began with the intent to understand the complexity of the microplastic problem. Specifiers were the target audience early on, as they are the group who dictate the material composition in product design. The design thinking process was applied throughout this thesis.

The author used a variety of brainstorming methods to identify where barriers existed in the design process. These exercises included mind maps, SWOT analysis, process diagrams, and lifecycle maps.

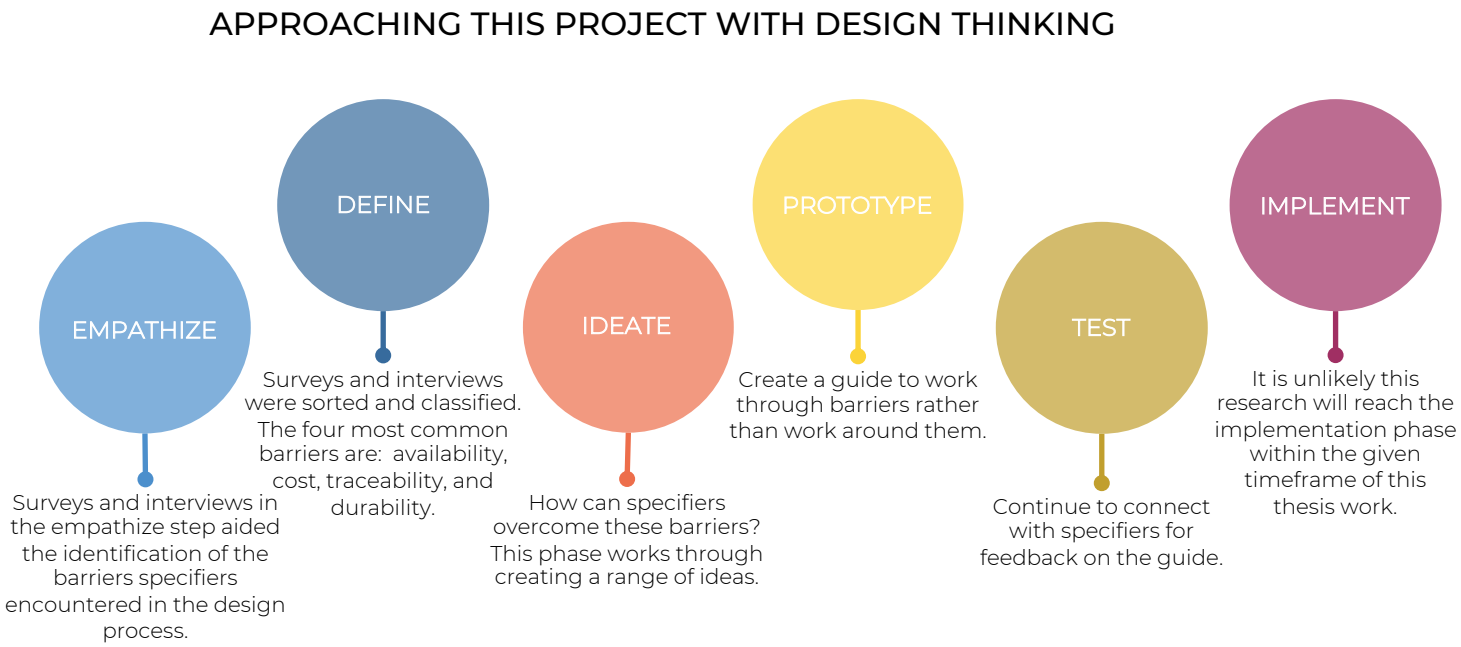

Figure 12: *Design Thinking* is a user-centered approach to problem-solving.[20] Here is a summary of how design thinking was used in this exploration.

Objective

INFLUENCING SPECIFIERS

Large organizations publish annual Environment, Social, and Governance (ESG) reports to address goals to investors and other stakeholders. This research analyzed reports from twelve brands, identifying that few reports mention microplastics. Those that did include microplastics do not mention a clear plan of action for mitigation. This research can be found in Appendix A.

Seventeen industry interviews and a survey targeted to soft goods specifiers assessed the barriers experienced in the design process. The survey can be read in full in the Appendix B. After only a few interviews, it was clear that specifiers were knowledgeable of the harm caused by synthetic fibers, yet there is a clear knowledge and action gap preventing responsible decision-making.

This research focuses on the need to shift from a reliance on fossil fuel-derived polyester toward more sustainable solutions. Shifting from educating to efforts of more sustainable solutions, specifiers remained the primary target audience. Specifiers are highly skilled and integral stakeholders to implementing change in the industry and the author realized **empowering specifiers to act holds the potential to create an industry-wide shift to responsible design.**

KNOWLEDGE ( ) ACTION

Figure 13: Ksenia Chernaya, July 13, 2019, Digital Photo, Pexels, https://www.pexels.com/photo/rolls-of-assorted-fabrics-and-textiles-and-sewing-patterns-inside-tailor-atelier-3965543/

Profit or People?

STAKEHOLDER MAPPING

Identifying stakeholders helps to illustrate the relationships of all those involved in a system. Here, brands are at the center as they make the decisions that impact their stakeholder partners, as well as the biosphere and downstream communities.

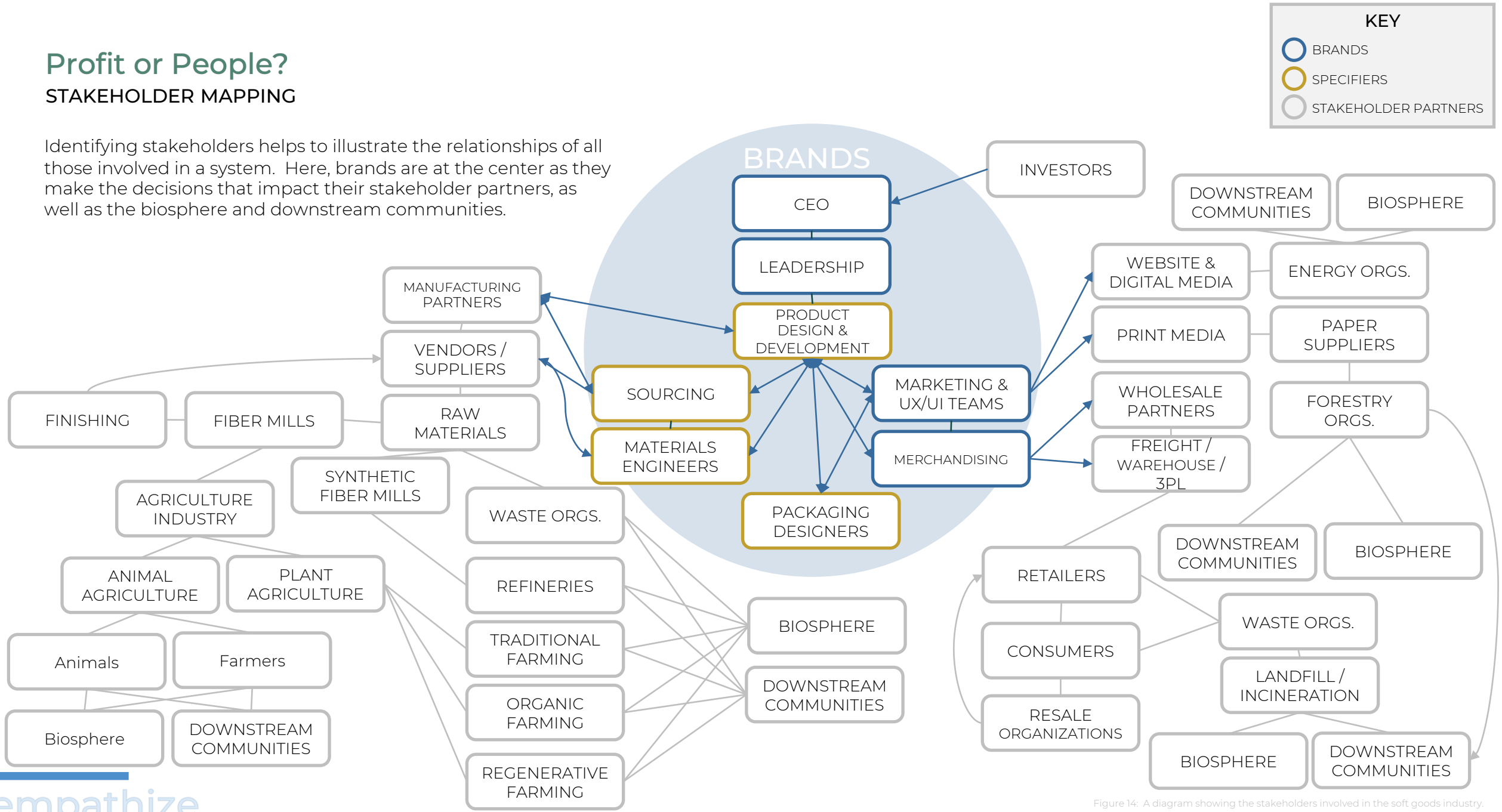

Figure 14: A diagram showing the stakeholders involved in the soft goods industry.

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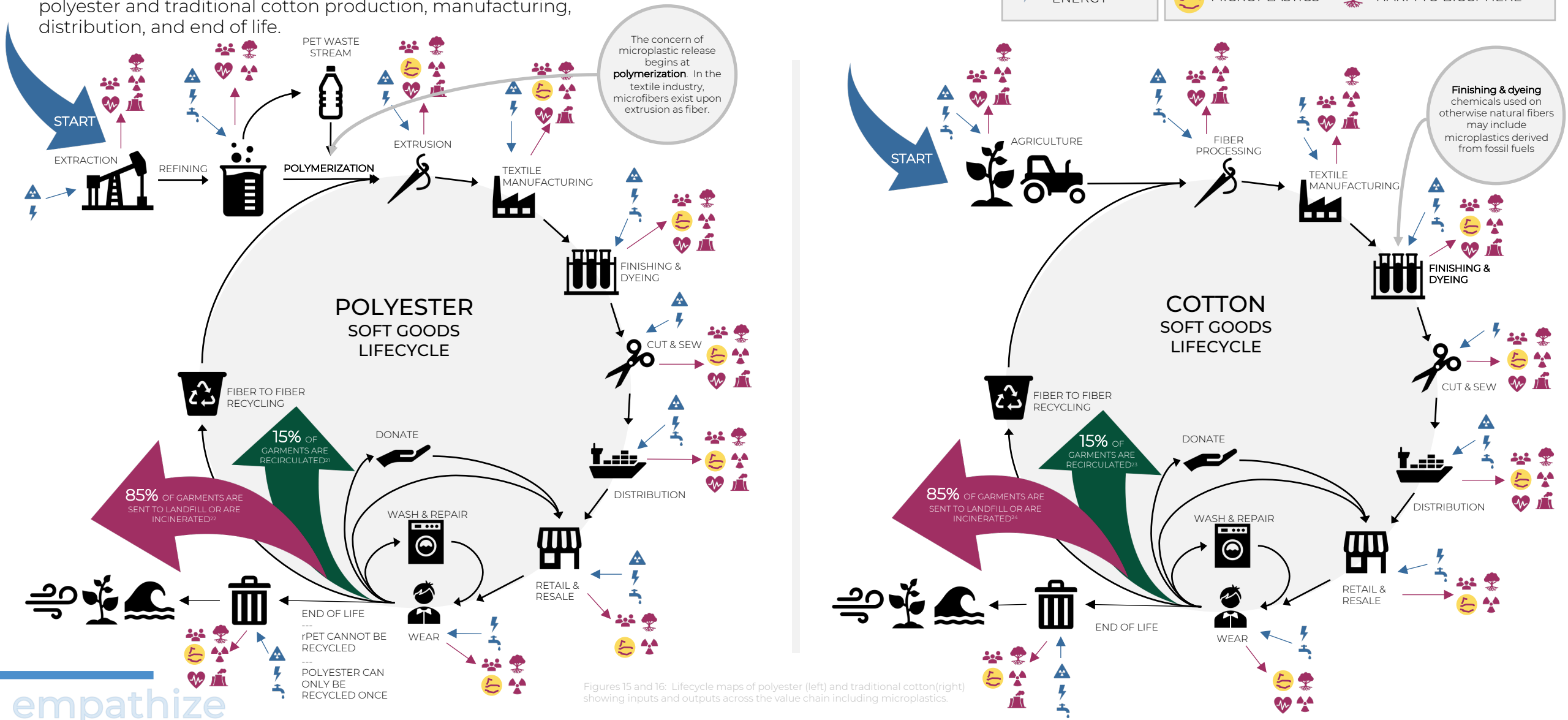
Soft Goods of Today

POLYESTER & COTTON LIFECYCLES

These lifecycle maps illustrate the current harmful systems of polyester and traditional cotton production, manufacturing, distribution, and end of life.



Figures 15 and 16: Lifecycle maps of polyester (left) and traditional cotton(right) showing inputs and outputs across the value chain including microplastics.

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Identifying Areas of Intervention

PROCESS MAP

Mapping the soft goods design process illustrates areas for intervention. This is important as the many stakeholders are involved within organizations and industry-wide. Knowing where to intervene highlights the key decision-makers in material specification.

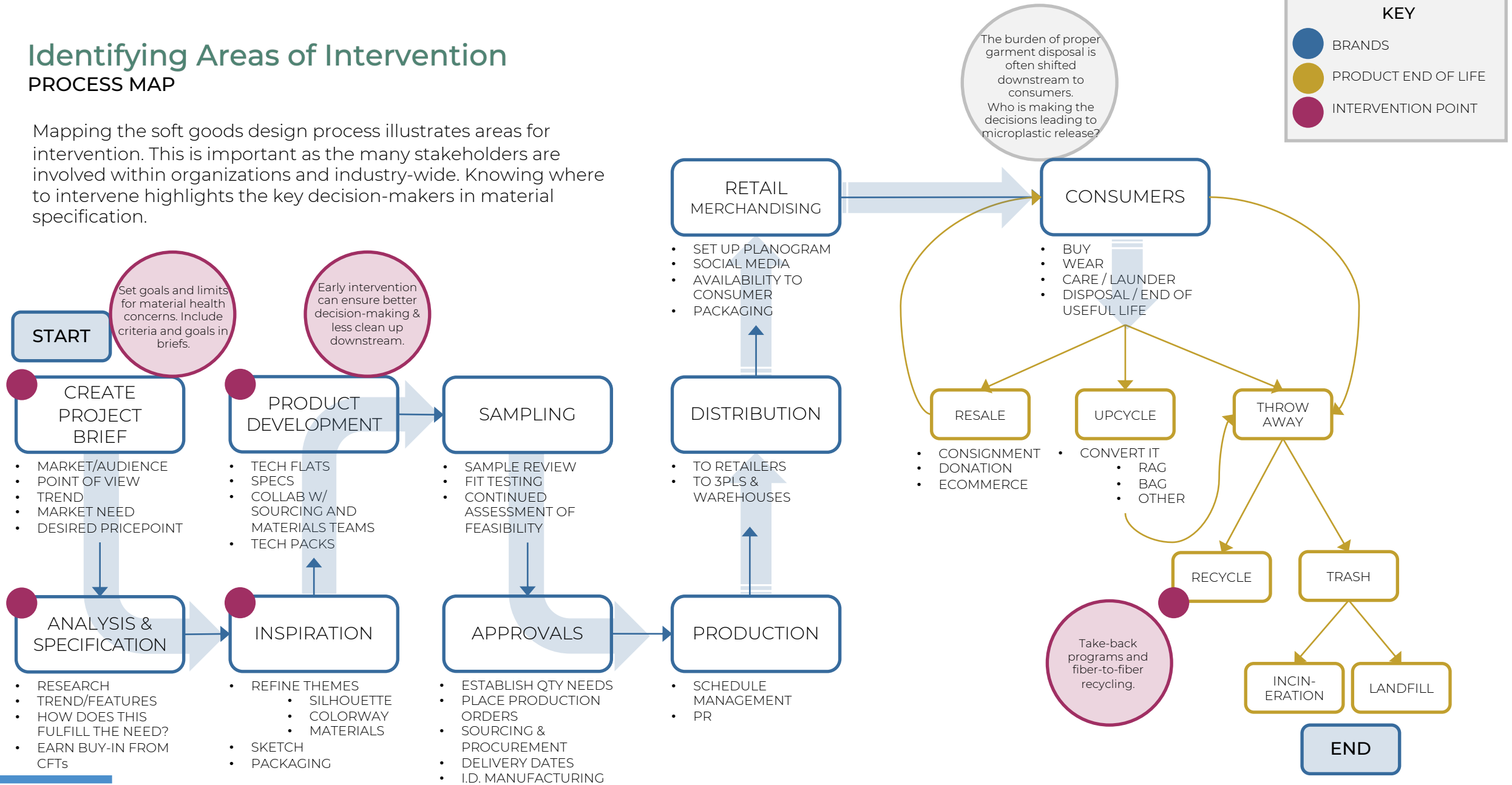

Figure 17: A process map showing the design process of soft goods from the development of the design brief to the products end of useful life. The pink dots identify possible areas of intervention to mitigate microplastic impact.

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Who Is Accountable?

EXTENDED PRODUCER RESPONSIBILITY

Today, brands are responsible for their goods until the point of sale, then that responsibility shifts to the consumer. From a sustainability perspective, this has important ramifications. This means that brands continue to manufacture products based on financial motivations while consumers carry the responsibility of proper care and disposal.

100 billion garments were produced in 2014, the first year on record to hit this milestone.[25] A trend that has continued to rise. Eventually, these billions of garments will become waste, either in a landfill or incinerated. The severity of the end-of-life impacts are dependent upon the material make-up.

The Current Perspective

This diagram shows a simplified process map of how soft goods are brought to market and who is responsible for the product at each stage.

While responsibility currently shifts to the consumer once a purchase is made, this research asks why the producers responsibility ends at this exchange?

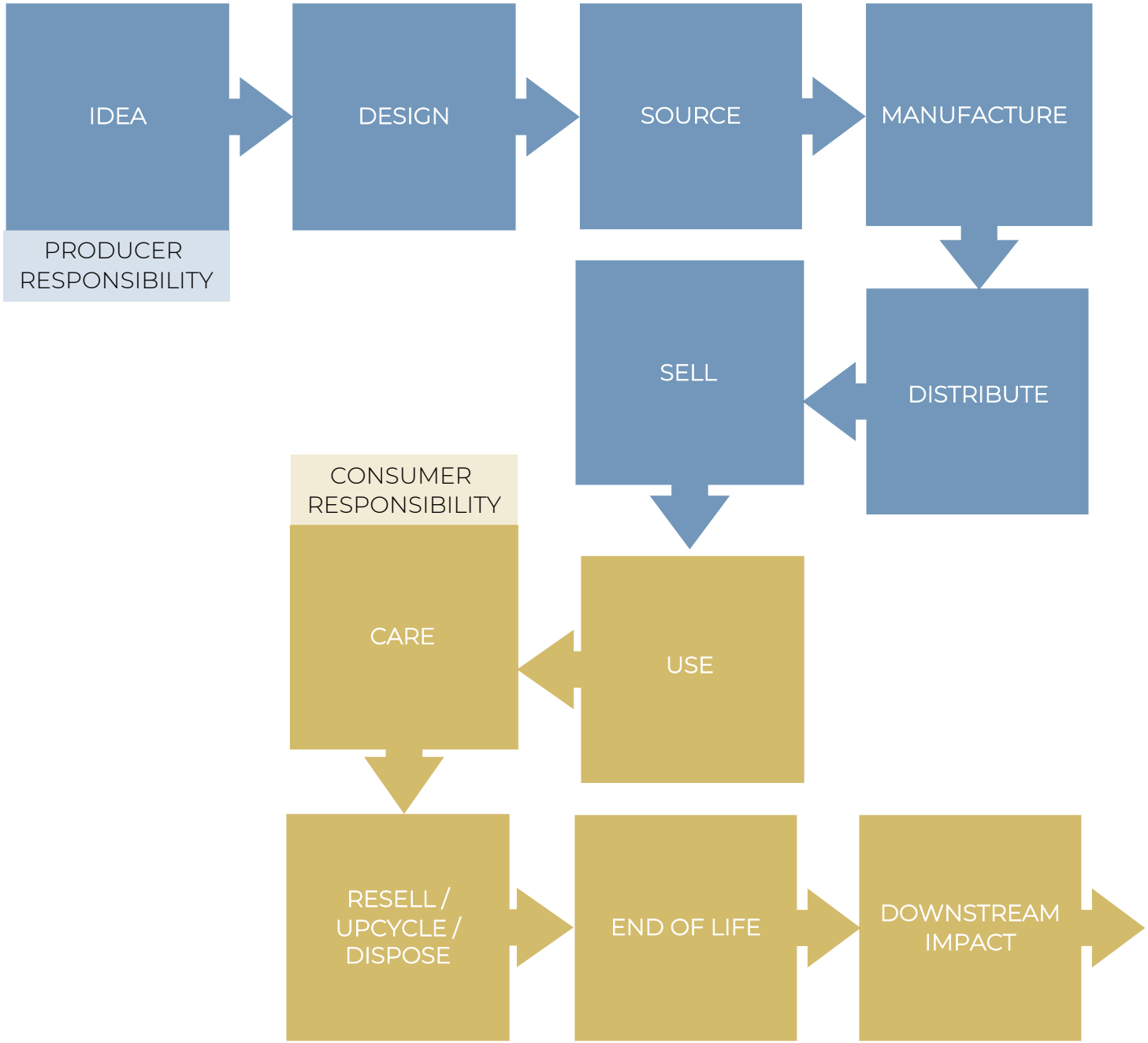

Figure 18: A diagram illustrating the shift from producer to consumer responsibility with the current industry perspective.

Future Accountability

EXTENDED PRODUCER RESPONSIBILITY

Extended Producer Responsibility (EPR) would ensure that brands are held accountable and shifts the industry from linear to circular processes. Producers and brands would become the responsible party for the entire useful life, and extending to the end of life, of the products they design, develop, and sell.

The Future Perspective

This diagram shows a simplified process map of bringing soft goods to market and who is responsible for the product at each stage.

The responsibility of a product is shared upon sale. Products are made with full lifecycle in mind, which means full consideration of material health, and both social and environmental impacts.

Consumers are empowered to care for their belongings and are provided tools by brands to mend and prolong the products useful life. Once that period ends, brands facilitate reincorporation of the product into the value chain via textile takeback programs or fiber to fiber recycling.

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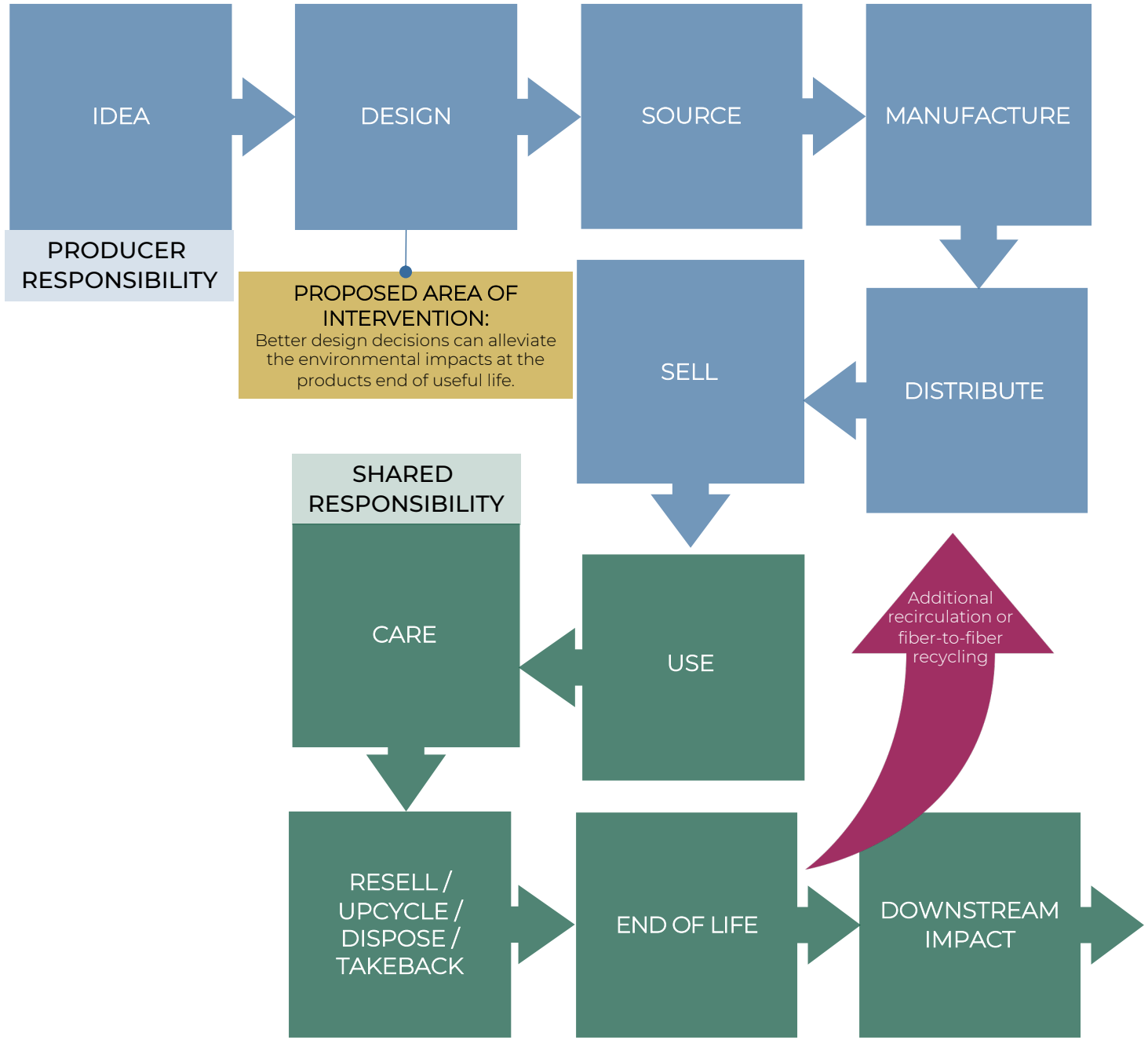

Figure 19 A diagram illustrating the shared producer and consumer responsibility of a product in a forward-looking perspective.

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Analysis of Specifier Impact

SWOT ANALYSIS

SWOT analysis is a brainstorming tool that provides a spectrum of thoughts associated with the strengths, weaknesses, opportunities, and threats of an idea. This SWOT analysis considers specifiers taking action to mitigate microplastic pollution by specifying responsible materials.

Specifiers are highly skilled and have an opportunity to bridge the knowledge-and-action-gap in specifying responsible materials. Engaging a variety of industry stakeholders, including cross-functional teams, would have the greatest impact to expand collaboration, access to data, and standardized testing methods.

Too often brands wait for legislation before changing course toward making improvements. **Insight: specifiers can initiate change with both the success of the brand and the well-being of the consumer and environment in mind.**

Strengths

- Specifiers are skilled and able to make improvements
- Innovation in materials
- Knowledge available → ability to act
- Data supporting harmful effects of synthetic fibers, destruction of the ecosystem, and harmful waste from the fashion industry
- Data regarding microplastics specifically
- Environmental groups advocating for better policy
- Growing awareness/curiosity
- Urgent need for change

Weaknesses

- Unclear if existing resources, like the Higg MSI[26] are: useful? Financially accessible? Scalable? Actionable?
- Lack of collaboration within fashion industry & across manufacturing partners
- Risk aversion – taking a risk may have financial implications and change the product development schedule
- Challenges of enacting strategic change
- Adoption by consumers (higher prices, etc.)
- Total disruption of the fashion industry

Opportunities

- Education/collaboration → shared resources → better products → longer use
- Restore connection and sense of pride for belongings
- Some companies already sharing data/cooperating
- More studies on short- and long-term effects
- Build domestic infrastructure
- Knowledge sharing
- Planning and acting
- Collaboration with consumers
- Global classification of microplastics

Threats

- Time / cost → hesitation toward adoption
- Oil/Fossil Fuel industry – power/money/corruption
- Government/policy needed for regulation of “unsafe/harmful” synthetic fibers
- Global sourcing/laws/regulations
- Misinformation/Greenwashing
- Organizations/manufacturers without resources or knowledge of more sustainable options
- Capitalism

Figure 20: A SWOT analysis of empowering specifiers to make better materials choices in the design process.

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Identifying Specifier Point of View

THROUGH INTERVIEWS AND A SURVEY

Figure 21: Andrew Neel, July 11, 2017, Digital Photo, Unsplash, United States, https://unsplash.com/photos/cckf4TsHAuw

To understand the specifier perspective, this researcher connected with seventeen industry professionals who shared their views and experience. Working in a range of capacities, each interviewee provided insights into the current state of industry progress on microplastic mitigation. Interviewees included product designers, materials engineers, researchers, educators, consultants, a microplastics-focused climate activist, and a brand's director of sustainability.

Specifiers are aware of the issue of microplastics, and harm caused by synthetic materials, but there is also an awareness that the system is broken. The textile system is driven by prioritization of financial gains at the expense of consumers, the environment, and downstream communities.

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INTERIVIEW HIGHLIGHTS

"Testing costs money and you discover things that are uncomfortable. How do you justify testing as a business decision?"

"Consumers trust that you're taking care of your due diligence."

"Let's solve the microplastics issue now. Don't let it become the new 'carbon effect.' "

"We need a shift in mindset: how can we change material properties by construction?"

"What can specifiers do for design and business?"

"You're only as good as the effort you're willing to put in to creating change."

"In general, the industry should do more testing."

"It's on us to figure out how to minimize the impact of microplastics from the initial design concept."

"The issue is everybody's issue, and we should treat it as such."

Analysis Of The Barriers In Materials Specification

AWARENESS OF THE ISSUE

Specifiers were surveyed to understand the barriers experienced in specifying responsible materials in their design process. Both quantitative and qualitative data were analyzed to understand these barriers. The full list of survey questions may be reviewed in Appendix B.

The data shows that specifiers understand the impacts of synthetic materials and their potential for harm yet specify them anyway. 100% of specifiers surveyed feel some to extreme levels of concern about the materials they specify.

It was clear in beginning of this research that there was a gap between knowledge and action within the industry, however this researcher had incorrectly assumed there was also a lack of available education on these material implications.

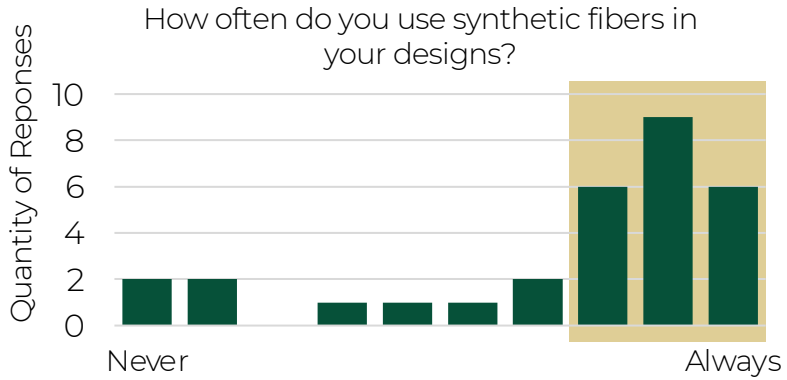
Zooming in, the following four slides explore possible areas of intervention to aid specifiers in developing and acting on a plan to deviate from the status quo. Brand owners (C-suite teams, large and small business owners) and the entire soft goods industry are also considered in these slides as stakeholders who hold decision-making power on a larger scale.

The four key barriers to specifying responsible materials from the survey are:

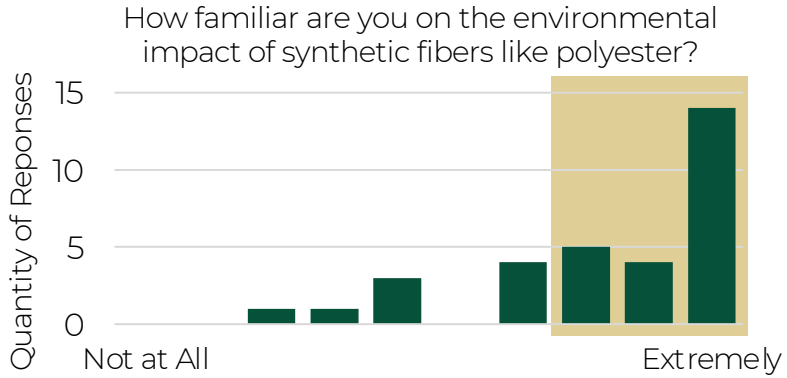
1. Availability
2. Cost
3. Traceability
4. Durability

NOTE: this exploration was shared with a few specifiers who are familiar with this research via survey and interviews. Their feedback is noted through the next four slides..

Survey Question #6



Survey Question #9



Survey Question #10

Figure 22: An excerpt of key results from the specifier survey.

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Addressing Availability in Materials Specification

76%

of Survey Responses Cite **Availability** as a Major Barrier in Specifying Responsible Materials

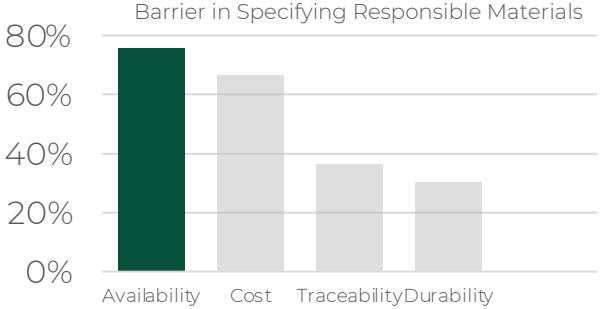


Figure 23: Survey results of the barriers encountered while specifying materials.

The top barrier among those surveyed was availability of responsible materials. Availability in terms of the accessibility, scalability, lead times, supply chain limitations, and lack of scientific advancement in the field. This was particularly evident among specifiers who work at small to medium-sized enterprises (SME's).

What could help make responsible materials more readily available? Investment in regenerative practices? Regulation? Locality?

Feedback from specifiers

	SPECIFIER (INDIVIDUAL)	BRAND OWNER (ORGANIZATION)	SOFT GOODS (INDUSTRY)
SUPPLIER PARTNERS	Establish & measure KPI's – emphasis on data • What are you currently measuring? • What needs to be changed? Ideate where to look more closely. Research and plan • Plan earlier to ensure access to material with longer lead times Partner with suppliers to ensure clear communication of needs	Establish & measure KPI's • What are you currently measuring? • What needs to be changed? Where to look more closely. Invest in suppliers willing to partner and grow responsible solutions	Promote and invest in innovation • Build partnerships and encourage like-minded brands to collaborate with suppliers Encourage investment in regenerative solutions Share information across the industry • Where can this info be stored even for those who *aren't* looking for it?
MATERIALS	Make a list of questions to ask your suppliers Slow the cycle • More research and planning into materials • Use existing data and/or expand to generate a successful plan for new product Visibility into supply vs. demand, capacity, and capabilities of mfg partners This would require restructuring of Product Development calendar	Work with organizations like Material Connexion to establish a network and investment in responsible/regenerative solutions Develop a materials matrix • Create clear guidelines • Include specific information • Inform teams of "why" Collaborate with other organizations investing in similar materials from the same suppliers • Require testing • Consider the entire system / impact of material from extraction through end of use • LCAs	Encourage industry-wide collaboration. Including farms/mills. • Less secrecy Evaluate systems • What is holding the industry back from regenerative solutions?
PEOPLE	Evaluate code of ethics • What are the impacts of these ideals and decisions? Build trust, promote learning and continuous improvement • Leverage consumer expectations • What does the consumer really want • Collaborative design with consumers – more consumer research / communication / interaction. What do customers really want?	Evaluate company code of ethics • What are the impacts of these standards/decisions • Develop guidelines consistent with the brand Build trust, promote learning and continuous improvement • Leverage consumer expectations • What does the consumer really want	Establish a working group / grassroots campaign These groups exist: American Apparel Association, Outdoor Industry Association, etc.
ACTION	Use knowledge to inform action • Identify alternatives if cost metrics cannot be met • Collaborate across the organization • Push for / demand support • Do research / make informed decisions	Build a network of vetted suppliers • Require certification • Require testing • Develop a contract for suppliers Collaborate with suppliers to ensure accurate reporting Pushing for legislation likely won't progress until value vs. profit balance	Established working group of professionals setting standards • Summit • Push for legislation • Create partnerships to leverage traceability across the industry • Ensure accessibility across all org sizes

Figure 24: Brainstorming of the categories in which change can occur as it relates to exploration of key stakeholders regarding availability and the specification of synthetic fibers in the soft goods industry. The "Specifier" column is highlighted as specifiers are the target audience of this research.

ideate

Addressing Cost in Materials Specification

67%

of Survey Responses Cite **Cost** as a Major Barrier in Specifying Responsible Materials

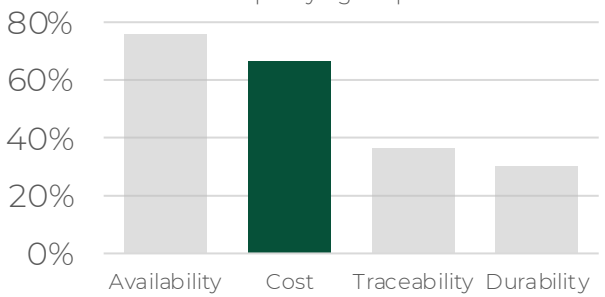


Figure 25: Survey results of the barriers encountered while specifying materials.

Cost was a significant theme across all survey responses, no matter the specifier's role or the company size. For most organizations, cost is seen as a limitation.

Fast fashion has grown significantly since the 1990s and our clothing has never been cheaper relative to cost of living and inflation.

Low-cost apparel has vastly driven consumption since the year 2000, with a shift in mindset from functional need to instant gratification.[27]

Feedback from specifiers

	SPECIFIER (INDIVIDUAL)	BRAND OWNER (ORGANIZATION)	SOFT GOODS (INDUSTRY)
SUPPLIER PARTNERS	Establish & measure KPI's • What are you currently measuring? • What needs to be changed? Ideate where to look more closely.	Establish & measure KPI's • What are you currently measuring? • What needs to be changed? Where to look more closely. Invest in suppliers willing to partner and grow responsible solutions	Promote innovation across the industry to increase standardization and bring costs down at the organizational level Promote investment in regenerative solutions
MATERIALS	Could costs be trimmed elsewhere (that don't sacrifice quality) to offset a possible increase in material cost? • Hangtag, packaging, etc. Ask questions • Are "sustainable" options more expensive? • What are the options? • What can be improved? Employ the precautionary principle Cost and durability are in conflict – cutting costs may result in sacrificing durability	Work with organizations like Material Connexion to establish a network and investment in responsible/regenerative solutions Collaborate with other organizations investing in similar materials from the same suppliers Invest in LCAs Redefining value/margin/success can propel better material use forward	Encourage industry-wide collaboration. Including farms/mills. • Less secrecy Require LCA's Without government regulations most companies won't invest in "better" materials
PEOPLE	Evaluate code of ethics • What are the impacts of these ideals and decisions? Build trust, promote learning and continuous improvement	Evaluate company code of ethics • What are the impacts of these standards/decisions Build trust, promote learning and continuous improvement	Establish a working group / grassroots campaign May encounter resistance from brands to participate
ACTION	Use knowledge to inform action • Identify alternatives if cost metrics cannot be met • Collaborate across the organization • Push for / demand support • Do research / make informed decisions • If cost increases for the consumer, offer education with material breakdown. Explain the "why" natural fibers are the "better" choice	Build a network of vetted suppliers • Require certification • Require testing • Develop a contract for suppliers Collaborate with suppliers to ensure accurate reporting Potential for new revenue streams or materiality	Established working group of professionals setting standards • Summit • Push for legislation • Create partnerships to leverage traceability across the industry • Ensure accessibility across all org sizes

Figure 26: Brainstorming of the categories in which change can occur as it relates to exploration of key stakeholders regarding cost and the specification of synthetic fibers in the soft goods industry. The "Specifier" column is highlighted as specifiers are the target audience of this research.

ideate

Addressing Traceability in Materials Specification

36%

of Survey Responses Cite **Traceability** as a Major Barrier in Specifying Responsible Materials

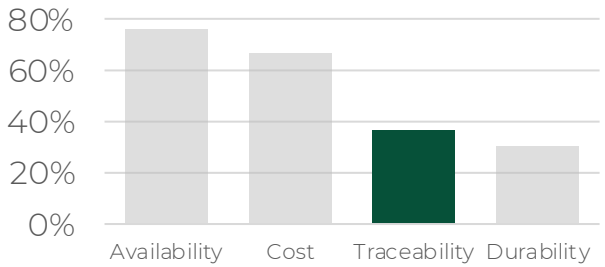


Figure 27: Survey results of the barriers encountered while specifying materials.

Visibility into material origin is a prevalent issue and there are many stakeholders involved.

Questions to consider:

- How can specifiers communicate effectively across the supply chain?
- How can specifiers have an impact?
- How can specifiers ensure choosing responsible materials vs. “less bad” options?
- How can specifiers convey due–diligence to build investor/brand owner/consumer trust?

Apply the Precautionary Principle to guide decision-making. Assess the risk of specifying synthetic materials when there is proof of harm across all stakeholder groups.

Feedback from specifiers

	SPECIFIER (INDIVIDUAL)	BRAND OWNER (ORGANIZATION)	SOFT GOODS (INDUSTRY)
SUPPLIER PARTNERS	Research supplier partners • What 3rd party certifications do the vendors use? • How does this impact your product assortment • Collaborate with vendors/suppliers • Vet suppliers, verify claims	Verify 3rd part certifications • Understand/prioritize this list Require/establish testing at the factory/mill level • Specify rate of microfiber release Trace supply chain across all tiers • Leverage tools that can help • Collaborate across the org. to verify claims and ensure compliance • Develop a contract • Train team members to ask effective questions in vetting new suppliers • Require and track data	Use Blockchain technology • Is this a viable solution? • How does this impact energy use? • What are the byproducts of this tech? • What is the accessibility of this technology? Standardization and consistency in data reporting
MATERIALS	Look at the technical and biological nutrient cycle • What is the raw material / what are the characteristics of these fibers? • What are the byproducts of production? • What are the finishes, treatments, additives? • Implications on stakeholders? • What is the rate of microfiber release? Create a materials matrix • Materials you can always use • Materials you can use sometimes • Materials you can never use Test for durability • How much / what type of pre-pro testing? Develop red lists • Create a phase-out plan • Sunset polyester	Create approved/vetted material matrix. • Collaborate with and put pressure on vendors/mills to ensure responsible practices.. • Develop a contract. Develop red lists • Create a phase-out plan • Sunset polyester Start now, get ahead of the curve, Brands are more likely to follow Federal Trade Commission regulations on labeling than “get ahead of the curve”	Establish EPR standards Set regulation Sunset polyester Push FTC to require traceability of synthetics So many governing bodies around materials sustainability creates subjectivity
PEOPLE	Designer pledge // Code of ethics • How do these material choices affect all stakeholders? • Understand how traceability impacts the level of trust you have in your designs AND the trust consumers have in your product	Evaluate company code of ethics • What are the impacts of these standards/decisions Build trust, promote learning and continuous improvement	Ethics/Guidelines • Set regulations on mills and material vendors/distributors • Industry-standard • How are people affected? • How is the environment affected?
ACTION	Use knowledge to inform action • Create a plan to red-list and phase-out underperforming materials / suppliers • Identify alternatives if traceability rules/metrics cannot be met • Collaborate across the organization • Push for / demand support • Do research, / make informed decisions	Build a network of vetted suppliers • Require certification • Require testing • Develop a contract for suppliers Collaborate with suppliers to ensure accurate reporting	Established working group of professionals setting standards • Summit • Push for legislation • Create partnerships to leverage traceability across the industry • Ensure accessibility across all org sizes

Figure 28: Brainstorming of the categories in which change can occur as it relates to exploration of key stakeholders regarding durability and the specification of synthetic fibers in the soft goods industry. The "Specifier" column is highlighted as specifiers are the target audience of this research.

ideate

Addressing Durability in Materials Specification

30%

of Survey Responses Cite **Durability** as a Major Barrier in Specifying Responsible Materials

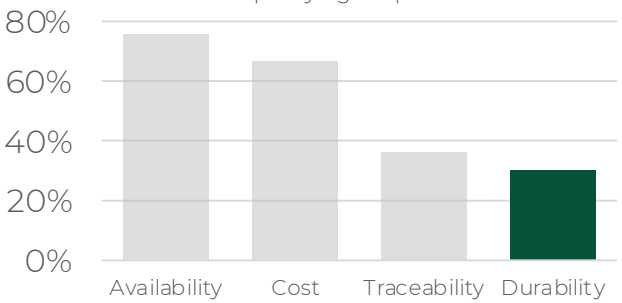


Figure 29: Survey results of the barriers encountered while specifying materials.

The term *durability* has become nuanced as garments have become disposable. Synthetic materials can be more difficult to repair and do not degrade at the end of useful life.

Consider the Laws of Thermodynamics:

1. The First Law: nothing disappears; matter and energy cannot be created or destroyed.
2. The Second Law: everything spreads; matter and energy disperse.

Specifiers should consider the implications of the full lifecycle of a product made of synthetic materials or finished with synthetic additives. What are its impacts at each stage of development?

Feedback from specifiers

	SPECIFIER (INDIVIDUAL)	BRAND OWNER (ORGANIZATION)	SOFT GOODS (INDUSTRY)

SUPPLIER PARTNERS	Research supplier partners
	• Put pressure on *and* partner with your vendors/suppliers
	• Establish *and* standardize testing methods
	  • Create KPIs
	  • Use ASTM or AATCC as a baseline, then what?
		Redefine durability/testing standards
		• What to address in testing?
		• How does it translate to material health?
		• Partner with mills to meet higher standards
		• Collaborate and leverage groups like Material Connexion, Sustainable Apparel Coalition, Textile Exchange
			Standardize testing methods
			• Hold supplier/mills accountable (taxes, rating system)
			• Provide funding and resources for innovation

MATERIALS	Look at the technical and biological nutrient cycle
	• What is the raw material / what are the characteristics of these fibers?
	• What are the byproducts of production?
	• What are the finishes, treatments, additives?
	  • Implications on stakeholders?
	• What is the rate of microfiber release?
	Create a materials matrix
	• Materials you can always use
	• Materials you can use sometimes
	• Materials you can never use
	Test for durability
	• How much / what type of pre-pro testing?
	Develop red lists
	• Create a phase-out plan
		Test for microfiber shedding
		• Create standards, adhere to them
		Create a vetted material matrix
		• Red-list materials for phase-out
		Collaborate with / put pressure on vendors/mills to ensure responsible practices
		• Develop a contract.
		Redefine “acceptable” poly-use (if any)
		• I.e. Performance or outerwear
		  • Minimal washing, tighter weave
		• Infrequent washing
		  • Pre-washed at mill
		  • 1st 1-5 washes create most microfibers in waterways.
		• Defining “phase-out”
		Durable products + revenue will be a challenge to implement in large orgs banking on fast fashion
			Redefine durability
			• Establish standards
			Create a working group to evaluate and vet organizations
			Standardization and transparency is lacking from country to country/material to material

PEOPLE	Designer pledge / Code of ethics • How do material choices affect stakeholders? • Self-exploration: What does “durable” mean to you? What does it mean in terms of specifying materials? Is there a disconnect here? How had durability changed over the years? Example exercise: • Estimate the age of your assortment • Reflect, approximate frequency of use, frequency of wash, last wear, intent to keep/sell/trash • Think about this for the products you design – what is the same? What differs?	Evaluate company code of ethics • What are the impacts of these standards/decisions? • How is this communicated in the organization ESG report?	Establish industry-wide ethical standards • Enforce them
ACTION	Use knowledge to inform action • Create a plan to red-list and phase-out underperforming materials • Identify alternatives • Collaborate across the organization • Push for / demand support • Do research, / make informed decisions	Require/establish product-specific LCA’s SLOW THE CYCLE • Define necessary cycles • ID product sales leaders • Speed to market	Established working group of professionals setting standards • Summit • Push for legislation • Create partnerships to leverage traceability industry-wide • Ensure accessibility

Figure 30: Brainstorming categories in which change can occur as it relates to exploration of key stakeholders regarding durability and the specification of synthetic fibers in the soft goods industry. The "Specifier" column is highlighted as specifiers are the target audience of this research.

ideate

Applying A Sustainable Design Framework To The Problem

THE NATURAL STEP (TNS)

Based on scientific principles, TNS is a framework used by organizations to build sustainable programs in an easily understood format.[28]

1. The Funnel

A metaphor used to visualize the environmental pressures leading to climate change and an array of other issues.

On the current path, the planetary limits will be surpassed, causing further degradation of the biosphere and society.

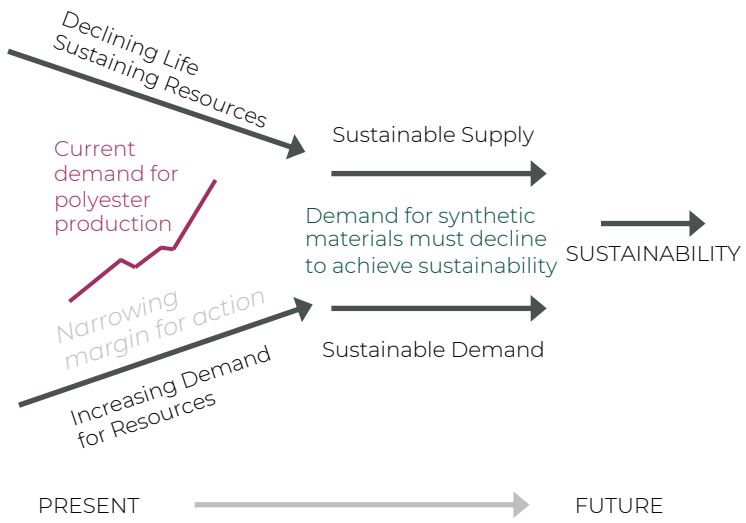


Figure 31: A table showing the steps of the Natural Step framework.

2. System Conditions

A series of four circumstances necessary to be a sustainable society with an emphasis on understanding of Earths systems.

Sustainable societies prioritize balance over constant growth. The system conditions as described in the Natural Step are:

1. Substances from the Earth's crust must not systematically increase in the biosphere.

- Polyester production continues to increase with little consideration of the impacts of GHG emissions from oil extraction, processing, and how this impacts the biosphere.

2. Substances produced by society must not systematically increase in the biosphere.

- Increased production adds unwanted garments globally, many are dumped in and near marginalized communities. For example, according to the *Business of Fashion*, Ghana is on the receiving end of 15 million articles of discarded clothing per year.[29] Microfibers are accumulating and persistent in the biosphere everywhere.

3. Nature's functions and diversity must not be systematically impoverished by physical displacement, overharvesting, or other forms of ecosystem manipulation.

- Drilling for oil impacts all corners of the Earth, disrupts ecosystems, and causes harm to the biosphere as it is linked to the cause of climate change.

4. Resources must be used fairly and efficiently in order to meet basic human needs globally.[30]

- Overproduction impacts all stakeholders. For example, resources such as clean water are diverted from communities to be used in manufacturing and pollutants used to produce polyester negatively impact disadvantaged communities.

3. Implementation Methodology

- Goal framing using Backcasting
  - Systematic planning
- Short term benefits / long-term perspective
- A-B-C-D approach

Awareness: an agreed understanding of the organization or issue from a whole systems perspective.

- According to the survey in APPENDIX A, common barriers in specifying more responsible materials are availability, cost, traceability, and durability.

Baseline Mapping: What does the organization or issue look like today? Identify the flows and impacts using Systems Conditions. What positive changes can occur?

- What are the current processes that lead to overproduction and over-specification of synthetic fibers? Look at one barrier at a time. Break it down.

Creating a Vision: What does this organization or issue look like in a sustainable society?

- Strategize and plan using *backcasting,* create a vision for the soft goods industry in a sustainable society.

Down to Action: Prioritize an action plan based on the shared vision. Train, implement, support, measure.

- Create an action plan. Get feedback. Test. Implement. Track. Report. Measure. Maintain.

define

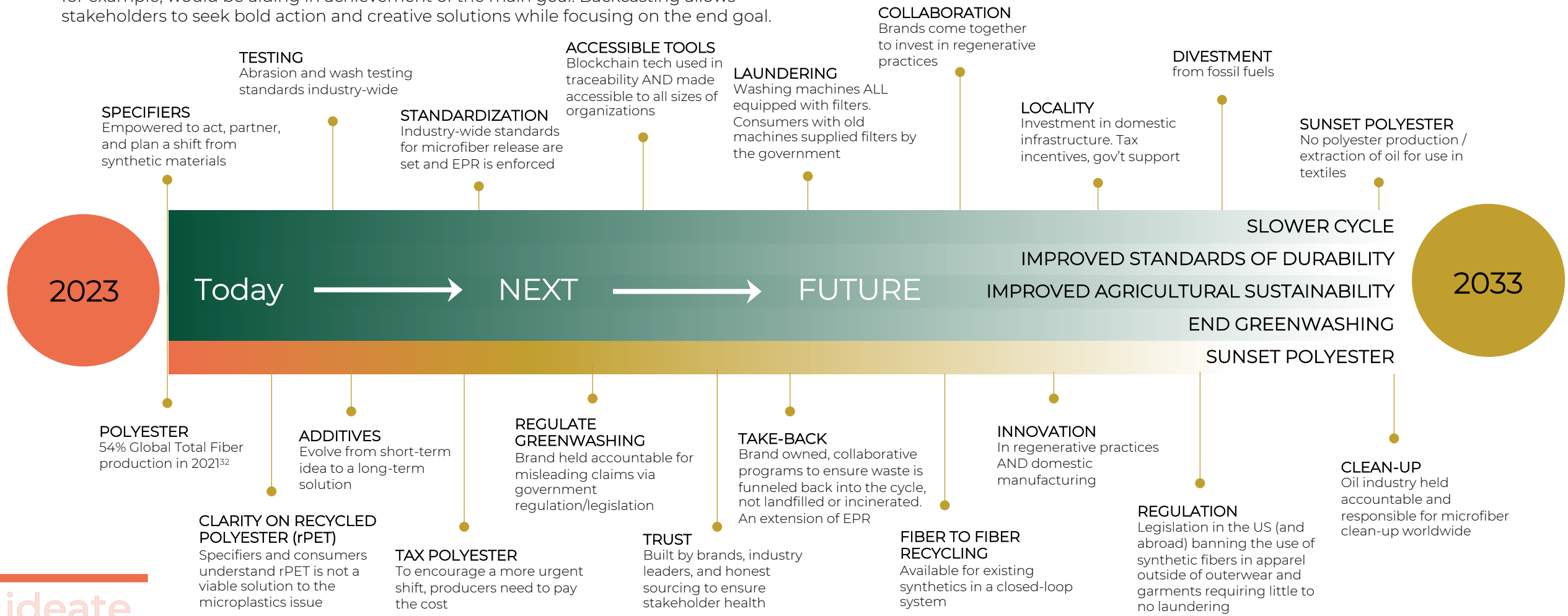
Creating a Vision for the Future

BACKCASTING

This diagram illustrates the process of *backcasting*, a method for developing a plan for a desired future.[31] A ten-year plan was established to end the use of polyester in soft goods. Working backward, a series of steps were defined in order to reach that goal. Other targets within the whole system view, slower cycle and ending greenwashing for example, would be aiding in achievement of the main goal. Backcasting allows stakeholders to seek bold action and creative solutions while focusing on the end goal.

KEY

- POSITIVE CHANGES TO A MORE SUSTAINABLE INDUSTRY
- END OF POLYESTER USED IN SOFT GOODS



ideate

Figure 32: A table showing the backcasting process.

OUTCOME

Developing The Method

THE SPECIFIER'S GUIDE TO ACTION

This guide serves as a brainstorming tool meant to give specifiers the opportunity to develop a plan for action. The user will incorporate a variety of sustainable design techniques to overcome barriers preventing them from specifying responsible materials.

Before beginning, the user must identify a big audacious goal and potential discoveries they hope to achieve when working through this guide. Once the goal is established, they will continue with the Discovery phase. The following ten steps are broken into three phases, each may be approached individually depending on the situation and time available to the user. This guide is designed to be approached chronologically; however, a specifier may adapt it to suit their needs. Specifiers may choose to use short bursts of research to build a bigger picture over time or implement the entire guide to build a long-term strategy. Steps may be repeated as further details may emerge with each pass.

At each step, the user will assess the risk of their exploration. It's important to evaluate risk in order to approach a topic with a whole system view to anticipate barriers and develop a plan to work through them. The final stage of the guide will encourage the user to prepare a 1-page vision or strategy from what they learned. This document will be used to inspire and persuade additional stakeholders to join their initiative.

	DISCOVERY		
In the Discovery phase, the user will evaluate their values, stakeholders, and identify if and where further education is needed.	1		Connecting Values
	2		Stakeholders
	3		Education
	PLANNING		
In Planning, the user will define quality and durability for the design, follow up with testing and analysis, and finish by reviewing communication around existing material and researching an alternative.	4		Define
	5		Test & Analyze
	6		Specify
	IMPLEMENTING		
In Implementation, the user will assess the impacts of their materials choices, revisit their network and reach out to potential collaborators, consider Earth's limits and establish how to implement reduction, and assess how to move this process toward a solution.	7		Employ the Precautionary Principle
	8		Collaboration
	9		Reduction
	10		Innovation

Figure 33: An introduction to the Specifier's Guide to Action to specifying responsible materials.

The Guide: A Full View

BRIDGING THE KNOWLEDGE & ACTION GAP

	STEP	ICON	TOPIC	EXPLORATION			ASSESS RISK
DISCOVERY	1		Connecting Values	Your values as a designer, values of the organization, of the industry. Notice similarities and differences. • Does your organization have goals to specify better materials?	• Ethics • Professionalism • Human / basic needs • Brand / organizational	• Observe • Make lists	• Limitations? • Barriers? • Risk of not acting?
	2		Stakeholders	Who is involved? Identify areas of intervention.	• Colleagues • Industry peers • Partners/Suppliers • Consumers	• Mind Map • Engage with someone new	• Limitations? • Barriers? • Risk of not acting?
	3		Education	Gaps in knowledge. What can be communicated more clearly? What would you like to learn?	• Peer-to-peer • Brand owners/CEOs • Decision-Makers • Investors • Consumers	• List-Making • SWOT Analysis • Lotus Blossom Technique	• Limitations? • Barriers? • Risk of not acting?
PLANNING	4		Define	Your definition and brand standards of quality/durability.: • Do these standards fall short? • What can be improved?	• What is durability? • How it it defined across the org.? • Across the industry?	• Survey peers • Survey an adjacent team	• Limitations? • Barriers? • Risk of not acting?
	5		Test & Analyze	Testing methods. • What is measured now? What should be measured? • What would it take to test microfiber release?	• ASTM or AATCC TM212[33] standards • LCA's • KPI's	• Identify testing methods • Create 2 new KPI's	• Limitations? • Barriers? • Risk of not acting?
	6		Specify	Information-sharing: • How are synthetic materials communicated? • Additives and finishes?	• Data • Avoid greenwashing	• Research an alternative	• Limitations? • Barriers? • Risk of not acting?
IMPLEMENTING	7		Employ the Precautionary Principle	The system. • Where are the impacts? • Will this problem push issues further downstream?	• Understand basic chemistry • TNS funnel • Good vs. less bad	• Practice backcasting	• Limitations? • Barriers? • Risk of not acting?
	8		Collaboration	Revisit your network. • Establish partners on an issue. • How can you collaborate to inform and persuade the remaining stakeholders?	• Revisit network • Establish partners • Establish a meeting cycle.	• Identify and engage partners	• Limitations? • Barriers? • Risk of not acting?
	9		Reduction	The Earth's limits.	• TNS Funnel - visualize demand & constraints • Slow the cycle	• Use data to inform/reduce	• Limitations? • Barriers? • Risk of not acting?
	10		Innovation	Leverage your network and your skills. • What is one thing you can do to move closer to the goal?	• What is one think you can do today? • In one month? • In one year?	• Start planning process early	• Limitations? • Barriers? • Risk of not acting?

Figure 34: A full overview of the Specifier's Guide to Action for specifying responsible materials.

prototype

From Synthetic to Sustainable: The Specifier's Guide to Action

PART 1: INTRODUCTION

The Guide will be formatted as a series of worksheets, giving specifiers to opportunity to evaluate the system in which they work and establish where in the system to intervene.

1. The specifier will first identify their **big audacious goa**l and list what they are hoping to discover from this guide.
2. Then, they will move to the Discovery phase where the user will work through a variety of exercises in reflection and brainstorming.

Sustainability Goal:

EXAMPLE: SUNSET POLYESTER

notes

Potential Discoveries:

EXAMPLE:

- FIND COLLABORATIVE PARTNERS
  - INTERNALLY
  - EXTERNALLY
- DEVELOP A PLAN WITH AN EXISTING SUPPLIER
- ENGAGE WITH NEW SUPPLIER
- EXPAND NETWORK
- LEARN SOMETHING NEW
- CHALLENGE ASSUMPTIONS
- REFRAME THE PROBLEM
- PUSH BRAND TO THINK OF THE FULL PRODUCT LIFECYCLE

notes

Figure 35: The first part of the Specifier's Guide to Action.

prototype

From Synthetic to Sustainable: The Specifier's Guide to Action

PART 2: DISCOVERY

This guide will be formatted as a series of worksheets, giving specifiers to opportunity to evaluate the system in which they work and establish where in the system to intervene.

1 Connecting Values

Begin by evaluating your values as a designer, the values of your organization, the values of the industry, and the values of your customer. Where do these values align? Where might there be a disconnect? Does your organization have goals to specify better materials?

- Ethics
- Professionalism
- Human / basic needs
- Brand / organizational

1. Observe and take notes
2. Make Lists

notes

To see the Specifier's Guide in practice, reference two case studies in Appendix C.

prototype

Limitations
Barriers
Not acting

Risk Assessment

2 Stakeholders

Consider the stakeholders involved. Be sure to include the environment. Take a whole systems approach. Create a mind map, a visual representation. Where do you see possible areas of intervention?

- Colleagues
- Industry peers
- Partners/Suppliers
- Consumers

1. Mind Map
2. Identify key decision-makers
3. Identify the champions
4. Engage with someone new

notes

Limitations
Barriers
Not acting

Risk Assessment

3 Education

What more would you like to learn? Where do you notice gaps in knowledge across your organization? Consider the type of information: supply chain, scientific, consumer needs, etc. Use brainstorming tools like list-making, SWOT analysis, the lotus blossom technique.

- Peer-to-peer
- Brand owners/CEOs
- Decision-Makers
- Investors
- Consumers

1. Understand motivations
2. SWOT Analysis
3. Lotus Blossom Technique

notes

Limitations
Barriers
Not acting

Risk Assessment

Figure 36: The Discovery phase of the Specifier's Guide to Action.

From Synthetic to Sustainable: The Specifier's Guide to Action

PART 3: PLANNING

In the Planning stage, specifiers will work through defining their brand standards, creating baseline assessments and testing methods, and specify an alternative material.

4 Define

Your definition and brand standards of quality/durability:
- Do these standards fall short?
- What can be improved?

- What is durability?
- Is it defined the same across your org.?
- Across the industry?

1. Survey
    a) Peers
    b) An adjacent team
2. Interview
3. Form partnerships

notes

To see the Specifier's Guide in practice, reference two case studies in Appendix C.

prototype

Limitations
Barriers
Not acting

Risk Assessment

5 Test & Analyze

Testing methods.
- What is measured now?
- What should be measured?
- What would it take to test microfiber release?

- ASTM or AATCC TM212[1] standards for microfiber release
- LCA's
- KPI's

1. Identify testing methods
    a) What is currently in use?
    b) Encourage new ways to look at testing, i.e. material impact
2. Measure a new KPI
    a) i.e. Where testing may fall short

notes

Limitations
Barriers
Not acting

Risk Assessment

6 Specify

Information-sharing:
- How are synthetic materials communicated?
- Additives and finishes?

- Data
- What is the messaging behind specification?
- Avoid greenwashing
- Ask yourself: where did I compromise?"
- What can I do to make sure this fiber will shed the least?

1. Identify an alternative
2. Consider how this alternative meets, exceeds, or falls short of testing methods from step #5.

notes

Limitations
Barriers
Not acting

Risk Assessment

Figure 37: The Planning phase of the Specifier's Guide to Action.

From Synthetic to Sustainable: The Specifier's Guide to Action

PART 4: IMPLEMENTING

In the Implementing stage, specifiers will create a plan to act. They will work through the remaining exercises, using backcasting, establishing partners, creating impact charts/red-lists, and develop a trend-proof long-term plan to achieve their **big audacious goal**.

7 Employ the Precautionary Principle

What are the current systems at play? When you make a choice make it a good one, not an alternative bad one. Take a step back and think of the whole system. Where are the impacts? Will this problem push issues further downstream?

- Understand basic chemistry
- Use the TNS funnel
- Good vs. less bad

1. Practice backcasting
2. Establish baseline, goals, and timeline

notes

To see the Specifier's Guide in practice, reference two case studies in Appendix C.

prototype

Limitations
Barriers
Not acting
Risk Assessment

8 Collaboration

Revisit your network from Phase 1. Establish partners on a given project/barrier/issue. How can you work together to inform, educate, and persuade the remaining stakeholders?

- Revisit network
- Establish partners
- Create a meeting cycle.

1. Identify and engage partners
2. Form a group or join an existing group

notes

Limitations
Barriers
Not acting
Risk Assessment

9 Reduction

The Earth has limits, it is degrading and cannot continue this plan/pace/path. Climate change tells us this.

- TNS Funnel - visualize the demand and constraints
- Slow the cycle
- Consider made-to-order approach

1. Use data to inform and reduce
    a) Identify underperforming SKUs early
2. Create an impact chart and/or red-list of materials

notes

Limitations
Barriers
Not acting
Risk Assessment

10 Innovation

Leverage suppliers and your network. What is one thing you can do today to move the needle toward your goal?

- What is one thing you can do now?
- Next month?
- Next year?

1. Start planning early
2. Develop trend-proof, long term plan

notes

Limitations
Barriers
Not acting
Risk Assessment

Figure 38: The Implementing phase of the Specifier's Guide to Action.

From Synthetic to Sustainable: The Specifier's Guide to Action

PART 5: ACTION STEPS

Once the desired steps have been completed, the specifier will create a 1-page vision/strategy to share with key partners. This vision should consider full system, the goals of the key partners, and the action items to achieve the goal.

The specifier should take a moment to reflect on their **big audacious goa**l and list of potential discoveries from the first part of this guide.

See two preliminary case studies using this guide in Appendix C.

Sustainability Goal:

EXAMPLE: SUNSET POLYESTER

notes

Vision/Strategy:

notes

Figure 39: The Action Steps phase of the Specifier's Guide to Action.

prototype

The Glory Days Are Over;
It's Time to Set the Sun On Polyester

OVERVIEW PRESENTATION DRAFT

Presenting the information discovered throughout this research in the form of a persuasive presentation has the potential to give this work more visibility and inspire specifiers on a global scale. The purpose is to get the attention of specifiers, brand owners, industry leaders; all stakeholders play a part and are all impacted by these choices. This presentation will be formatted just like a TED Talk,[34] shorter than 18 minutes in length, and include three parts:

Main Idea & Background Information

- A future vision: no more polyester
- Quick, concise facts
    - The problem: microplastics
    - The industry: soft goods
    - The target audience: material specifiers
    - The idea: sunset polyester
- There will be a focus on the audience
- Why should the audience care?

Evidence to Prove the Point

- Set the scene
    - Show microplastics, where they are found
    - Share history of polyester
    - Share recent headlines; i.e. legislation requiring filters on washing machines.
    - Share empirical evidence; i.e. studies finding microplastics in human blood, in soil, in oceans, in the food system
- Acknowledge and address counterarguments to the main idea.
    - Fossil fuel industry
    - Barriers to specifying alternatives

Figure 40: Bogomil Mihaylov, January 18, 2018, Digital Photo, Unsplash, https://unsplash.com/photos/ekHSHvgr27k

Evidence-Based Conclusion

- Introduction of the "Specifier's Guide to Action"
- Share a call to action
    - Something hopeful, meaningful
    - Challenge specifiers to say "no" to polyester
        - Challenge consumers to say "no" to polyester
        - Include all stakeholders

The Glory Days Are Over;
It's Time to Set the Sun On Polyester

OVERVIEW PRESENTATION DRAFT

1

Figure 41: Karl Wiggers, October 6, 2021, Digital Photo, Unsplash, United States https://unsplash.com/photos/-X401LkrrmOg

INTRODUCTION
A future vision

IMAGERY
A field of cotton

Script

Natural fibers can be grown in ways that benefit the local ecosystem. Growing fiber plants with regenerative practices provides benefits to people and the biosphere.

A beautiful vision.

2

Figure 42: Chris LeBoutillier, January 21,2021, Digital Photo, Unsplash, https://unsplash.com/photos/TUJud0AWAPI

WHAT
Quick, concise facts

Script

The current industry.

- The problem: microplastics
- The industry: soft goods
- The target audience: soft goods materials specifiers
- The idea: sunset polyester

The Glory Days Are Over;
It's Time to Set the Sun On Polyester

OVERVIEW PRESENTATION DRAFT

3

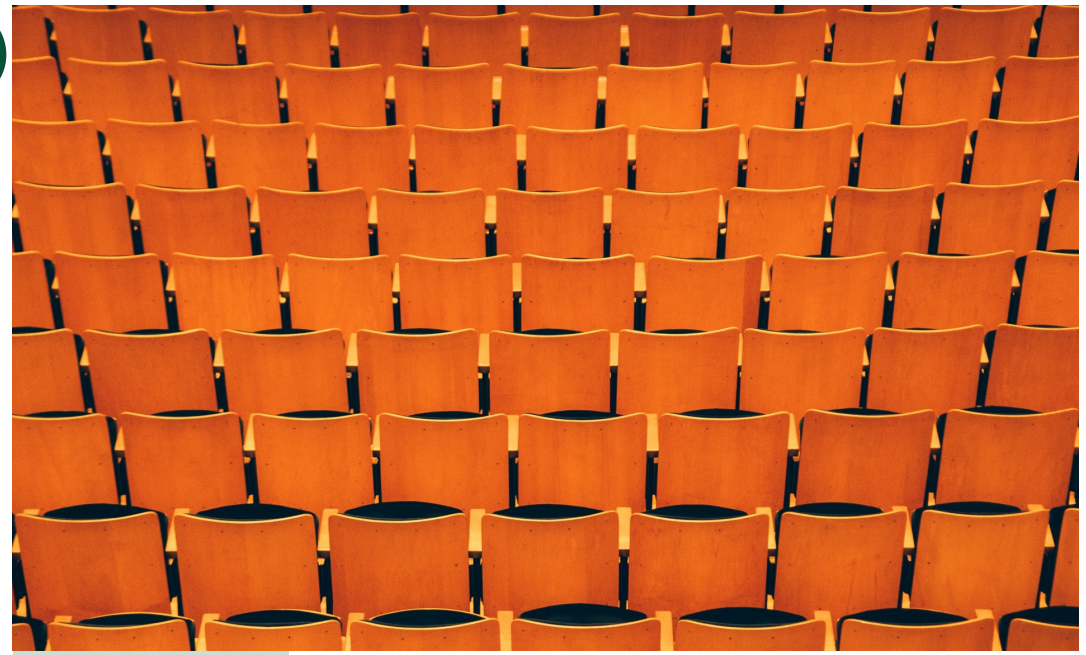


Figure 43: Andrew Seaman, March 16, 2018, Digital Photo, Unsplash, United States https://unsplash.com/photos/Y8ruVPHUSnc

WHO
The audience

IMAGERY
The audience

Script

"I would bet that 99% of us are wearing polyester right now. Take a moment to look at the tags on your clothing or have your neighbor help. Who here is wearing polyester? Let's see a raise of hands."

"Was it like this 10 years ago? 20 years ago? 50 years ago?"

4

Figure 44: Brooke Lark, December 10, 2019, Digital Photo, Unsplash, United States https://unsplash.com/photos/RrzeCGujVfU

WHAT
Comparison with farm to table movement

Script

Just like the "farm to table" movement, we are are at the impetus of a movement to regenerative options for our closets.

- Not only for our health, but for the health of future generations

Clothing is one of the most intimate needs. We rely on it to keep us warm, provide protection, and show our sense of style. It is a basic need.

The Glory Days Are Over;
It's Time to Set the Sun On Polyester

OVERVIEW PRESENTATION DRAFT

5

Figure 45: Soren Funk, May 30, 2021, Digital Photo, Unsplash, United States https://unsplash.com/photos/jQuky0VINAI

SIDE BY SIDE
End of Life
Deadstock cotton fabric and plastic ocean pollution

Script

"When we design, we focus on designing the use case for each garment, but what happens after a consumer is finished with it? What happens at the fabric's end of life?

Show microplastics, where they are found

- Literally everywhere. It may seem like a far-away problem, but they are very close. Everyone is likely in contact with them now: wearing them, sitting on them, cleaning with them, breathing them, etc.

6

Figure 46: Pawel Czerwinski, June 24, 2018, Digital Photo, Unsplash, United States https://unsplash.com/photos/KskMZa4RXAM

WHO
Specifiers at work: sketching, prototyping, decision-making

Script

- Share history of polyester
  - Commercial polyester introduced in 1941[35]
  - Show the lifecycle of poly
    - How it starts, how it's transformed into clothing, etc.
    - Show how this differs from regenerative fiber systems
- Share recent headlines; i.e. legislation requiring filters on washing machines.
- Share empirical evidence; i.e. studies finding microplastics in human blood, in soil, in oceans, in the food system

The Glory Days Are Over;
It's Time to Set the Sun On Polyester

OVERVIEW PRESENTATION DRAFT

7

Figure 47: Emmanuel Boldo, August 9, 2021, Digital Photo, Unsplash, Mexico, https://unsplash.com/photos/ajzJGT6XLXc

WHO
Specifiers at work: sketching, prototyping, decision-making

Script

"As designers and product developers, we make decisions for the consumer every day. Shouldn't we be making choices that benefit them? That make them feel good? That keep their well-being in mind?

While we make these decisions every day, we also receive a lot of pressure to meet the requirements of our employers; to meet our budget, our timelines, and our bottom line."

8

Figure 48: Jukan Tateisi, August 7, 2017, Digital Photo, Unsplash, Japan, https://unsplash.com/photos/bJhT_8nbUA0

WHAT
Challenge

IMAGERY
A challenge

Script

"What if we challenged these norms? How could these changes improve the system?"

The Glory Days Are Over;
It's Time to Set the Sun On Polyester

OVERVIEW PRESENTATION DRAFT

9

Figure 49: (Left) Trisha Downing, August 10, 2017, Digital Photo, Unsplash, United States, https://unsplash.com/photos/pyud8ZaVq4I. (Right) Maria Lupan, August 21, 2021, Digital Photo, Unsplash, Tenrife, https://unsplash.com/photos/hy97yy3e03A.

SIDE BY SIDE
Origin Story
Cotton fiber vs. oil rig, show charts from life cycle assessments

Script

"Let's look at the lifecycle of two of the most common fiber sources in apparel: cotton and polyester. Both have gotten a bad wrap from either sides of the industry.

- Cotton for being land- and water-intensive, often grown using pesticides.
- Polyester for being a fossil fuel and shedding microfibers."

10

Figure 50: Janko Ferlic, October 17, 2016, Digital Photo, Unsplash, https://unsplash.com/photos/eBtwD6ZG78I.

IMAGE
Manufacturing
Cotton spools.

Show life cycle diagrams.

Script

"Cotton yarns are spun from natural staple fibers, while polyester is made using extreme pressure and heat to melt plastic pellets and extrude them through tiny spinnerets.

Textile factories are major contributors to both air and water pollution. That's why it is important to ask questions and properly vet our suppliers."

The Glory Days Are Over;
It's Time to Set the Sun On Polyester

OVERVIEW PRESENTATION DRAFT

11

Figure 51: (Left) Mukuko Studio, November 19, 2019, Digital Photo, Unsplash, https://unsplash.com/photos/mU88MIEFcoU. (Right) Freestocks, January 9, 2017, Digital Photo, Unsplash, Poland, https://unsplash.com/photos/_3Q3tsJ01nc.

SIDE BY SIDE
Consumer relationship
Cozy, favorite cotton sweater & intro to Specifier's Guide to Action

Script

"How we interact with our clothing is important. Why do we consume excess clothing when we have our one favorite sweater that we wear over and over? Its those pieces that allow us to build a connection to our closets.

We should be designing *these* products. Products that feel good, products that are good for us."

Introduce the Specifier Guide to Action.

12

Figure 52: Jon Tyson, August 7, 2019, Digital Photo, Unsplash, https://unsplash.com/photos/tangfe8KQdw

CALL TO ACTION

Specifier Guide to Action

Sunset polyester

Script

Implementing the guide and expected benefits.

Conclusion.

Call to action: sunset polyester. "With this tool, you can create your plan today."

"Thank you."

Project Evolution
INSIGHTS GAINED

Emerging Insights

Specifiers are often hopeful for a silver-bullet solutions. Blockchain technology and advanced materials science are a couple of these ideas, ideas that are not fully developed and may not solve the problem.

Instead, it's important to approach the microplastics problem with curiosity, a willingness to challenge assumptions, consider the full system, and the application of design for sustainability strategies. The author came to understand the solution is to phase out the bad actor, polyester, and develop a way to help specifiers make the shift.

The author worked through the Specifier's Guide to Action individually and with a specifier on two real-life scenarios. These Case Studies brought to light the importance of reframing problems, stakeholder mapping, backcasting, and zooming out to look at the full system in order to consider alternative options.

Developing a long-term strategy by using the Specifier's Guide to Action, the industry can work toward a system of embracing responsible practices. All stakeholders must be aligned, so it will be important to develop a strategy that looks to create fully sustainable, long-term solutions to phase out polyester.

Potential Positive Sustainability Impact

The Specifier's Guide to Action should go through further testing and feedback sessions with specifiers before being rolled out to a wider audience. It would continue to evolve and be adapted over time and across situations. This series of worksheets would be accessible on a website for easy downloads. Even if its not followed exactly, the guide would help start the process and give specifiers ideas about tactics they may not have considered.

Eventually, it could grow into a community of specifiers looking for solutions, brainstorming and sharing success stories to inspire others across the industry. It might include the following:

- Industry examples
- Network
- Downloadable worksheets
- Additional videos, resources
    - Tools
    - Template for red-listed materials
    - Traceability tools
        - Vetted suppliers/manufacturers

The overview presentation could expand to have greater reach if it is presented on the TED stage, at conferences, and within organizations.

Functionality / Viability

The "From Synthetic to Sustainable: The Specifier's Guide to Action" serves as a tool to problem solving by incorporating a variety of sustainable design methods into the soft goods industry design process. **Materials specification is a system-wide issue and must include systems thinking in order to develop any viable solutions.**

This guide also aids specifiers in how to phase out red-listed materials in addition to polyester. With this tool, they can work toward redefining material health for their organization, consider the full lifecycle of a product based on material choices, and incorporate thoughtful planning into the design process. More planning could encourage longer cycles which would decrease the total volume of product produced, known as *reduction*. Planning for better products may promote brand loyalty for consumers and encourage collaboration with cross-functional teams.

CONCLUSION

Project Conclusion

WHAT DID THIS THESIS ACCOMPLISH?

Early in this research, specifiers were assumed to lack knowledge that synthetic materials were harmful and led to microplastic pollution. Education seemed like a simple solution; however, through the specifier survey and industry interviews it quickly became clear that specifiers do understand that synthetic materials are a problem, and they are deeply concerned about this issue. Yet understanding the issue has not prevented the specification of polyester.

Rather than relying on education alone, it was clear that a plan for action paired with education and collaboration would be worth exploring further. Discovering this has sparked a desire to continue to test and refine this tool to help specifiers make responsible materials choices. As microplastic pollution is an industry-wide issue, it is important to work collectively, involving all stakeholders to sunset polyester.

Specifiers are genuinely interested in mitigating the impacts of microplastics. Seventeen individuals agreed to be interviewed and thirty-three took the survey. Their honest and passionate responses helped guide this research throughout its entirety. One key takeaway was that many specifiers want a tool that is accessible and adaptable to their own work, which is why the Specifier's Guide to Action is as flexible as it is. Working through the Guide along with a fellow specifier reinforced this need (See Appendix C). This exercise provided insight and areas for development that would be useful to continue testing and refining with additional specifiers.

Unsurprisingly, greenwashing remains a big issue across the industry. The idea that recycled polyester (rPET) is a solution is misleading. Many people, consumers and some specifiers, do not understand that once rPET is used in textile fibers it cannot be recycled again. Similarly, additives used in synthetics to promote biodegradation require more testing as they donot meet standards of biodegradability. The Specifier's Guide to Action may be used as a tool to mitigate this misinformation and seek sustainable solutions.

Figure 53: Freddie Marriage, May 22, 2017, Digital Photo, Unsplash, https://unsplash.com/photos/vSchPA-YA_A.

Project Conclusion

ACCOMPLISHMENTS AND NEXT STEPS

Concluding this thesis has come with several accomplishments:

- A new tool empowering specifiers to act on selecting responsible materials
- Testing this tool in a real-life case study
- A draft of a presentation that can be refined and shared
- A network of specifiers who are passionate about making good products
- The shared idea that microplastics are an issue and to phase out the bad actor: polyester

The realization that this is just the beginning of this research has opened a continuous thread of questions. Many of these questions come back to industry standards and the need for:

- Standardized testing on microfiber release
- Standardized testing on a global scale; testing in the United States varies greatly from the United Kingdom
- Accessibility of standardized tools for all specifiers and organizations to use

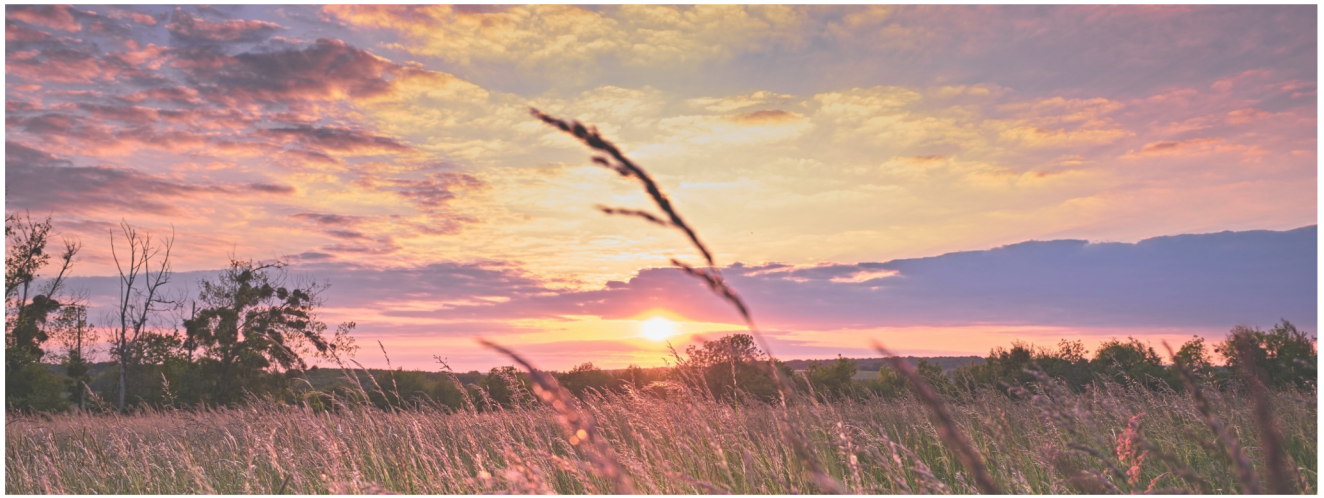


Figure 54: Sven Becker, May 28,2020, Digital Photo, Unsplash, https://unsplash.com/photos/sDAkjzUSZr4.

Next Steps

Specifiers are a small piece of the puzzle; the industry needs an overhaul, and all stakeholders will need to participate. The Specifier's Guide to Action is an excellent starting point for specifiers to begin shifting the narrative and create a plan for action.

This research has led to other ideas and questions that are worth exploring:

- Developing new iterations of the Specifier's Guide to Action
    - Testing and further evolution
    - Building a website to make these worksheets accessible for all industry professionals
    - Expanding on the worksheets to include more resources and networking opportunities
    - Organizing a working group
- Furthering organization- and industry-wide collaboration
- Pushing for legislation
- Leveraging innovation and technology
- Researching fiber finishes.
    - Natural fibers are becoming harmful due to additives and dyes
- Redefining durability industry-wide
- Slowing the fashion cycle
- Making less
- Researching other ways to sunset polyester
- Asking more questions about additives for synthetics
    - Do they just make it harder to clean up microplastics?

WORKS CITED

Works Cited

1. Palacios-Mateo, Cristina, Yvonne van der Meer, and Gunnar Seide, “Analysis of the Polyester Clothing Value Chain to Identify Key Intervention Points for Sustainability.” Environmental sciences Europe. U.S. National Library of Medicine, January 6, 2021. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7787125/.
2. Jahnz, Adalbert, Sonya Gospodinova, Daniela Stoycheva, and Federica Miccoli, “Questions and Answers on EU Strategy for Sustainable and Circular Textiles.” European Commission. European Commission, March 30, 2022. https://ec.europa.eu/commission/presscorner/detail/en/qanda_22_2015.
3. Opperskalski, Sophia, Amy Franz, Andrea Patanè, SuetYin Siew, and Evonne Tan, “Textile Exchange Preferred Fiber & Materials Market Report.” Preferred Fiber And Materials Market Report. Textile Exchange, October 1, 2022. https://textileexchange.org/app/uploads/2022/10/Textile-Exchange_PFMR_2022.pdf.
4. Laura Díaz Sánchez, “The Invisible Threat: Microplastics from Your Clothes.” Plastic Soup Foundation, March 3, 2021, accessed July 29th, 2021, https://www.plasticsoupfoundation.org/en/2021/03/the-invisible-threat-microplastics-from-your-clothes/.
5. Kahane-Rapport, S. R., M. F. Czapanskiy, J. A. Fahlbusch, A. S. Friedlaender, J. Calambokidis, E. L. Hazen, J. A. Goldbogen, and M. S. Savoca. “Field Measurements Reveal Exposure Risk to Microplastic Ingestion by Filter-Feeding Megafauna.” *Nature Communications* 13, no. 1 (November 1, 2022). https://doi.org/10.1038/s41467-022-33334-5.
6. Boucher, J., and D. Friot, “Primary Microplastics in the Oceans: A Global Evaluation of Sources.” *International Union for Conservation of Nature* , February 21, 2017. https://doi.org/10.2305/iucn.ch.2017.01.en.
7. Wang, Wenfeng, Jing Ge, Xiangyang Yu, and Hui Li, “Environmental Fate and Impacts of Microplastics in Soil Ecosystems: Progress and Perspective.” Science of The Total Environment. Elsevier, November 14, 2019. https://www.sciencedirect.com/science/article/abs/pii/S0048969719348338.
8. Forschungsverbund Berlin, "An underestimated threat: Land-based pollution with microplastics." ScienceDaily. www.sciencedaily.com/releases/2018/02/180205125728.htm (accessed September 20, 2022).
9. Ibid.
10. *Palacios-Mateo, Cristina, Yvonne van der Meer, and Gunnar Seide, “Analysis of the Polyester Clothing Value Chain to Identify Key Intervention Points for Sustainability.” Environmental Sciences Europe 33, no. 1 (January 6, 2021). https://doi.org/10.1186/s12302-020-00447-x.*
11. Carrington, Damian, “Microplastics Found in Human Blood for First Time.” The Guardian. Guardian News and Media, March 24, 2022. https://www.theguardian.com/environment/2022/mar/24/microplastics-found-in-human-blood-for-first-time.

Works Cited

12. GRID-Arendal/Studio Atlantis, “Human Exposure to Microplastic and Nanoplastic Particles A.” GRID, 2021. https://www.grida.no/resources/15024.
13. “Textile Exchange Preferred Fiber and Materials Market Report 2021.” Textile Exchange, October 19, 2022. https://textileexchange.org/news/textile-exchange-preferred-fiber-and-materials-market-report-2021/.
14. Cernansky, Rachel, “A California Bill Is Taking Action against Microfibres by Focusing on Washing Machines.” Vogue Business. Vogue Business, March 30, 2023. https://www.voguebusiness.com/sustainability/a-california-bill-is-taking-action-against-microfibres-by-focusing-on-washing-machines#:~:text=A%20bill%20moving%20through%20the,machines%20into%20the%20world's%20waterways.
15. Fashion Revolution. Accessed April 2, 2023. https://www.fashionrevolution.org/.
16. “Fibershed: Home.” Fibershed, March 21, 2023. https://fibershed.org/.
17. “Sustainable Fashion: HechoXNosotros: Argentina.” HechoxNosotros. Accessed April 2, 2023. https://www.hechoxnosotros.org/.
18. “It's Time for a Circular Economy.” How to Build a Circular Economy | Ellen MacArthur Foundation. Accessed April 2, 2023. https://ellenmacarthurfoundation.org/.
19. “Sustainable Product Policy.” EU Science Hub. Accessed February 12, 2023. https://joint-research-centre.ec.europa.eu/scientific-activities-z/sustainable-product-policy_en.
20. Gibbons, Sarah, “Design Thinking 101.” Nielsen Norman Group, July 31, 2016. https://www.nngroup.com/articles/design-thinking/.
21. Press, Rich, “Your Clothes Can Have an Afterlife.” NIST, May 9, 2022. https://www.nist.gov/news-events/news/2022/05/your-clothes-can-have-afterlife#:~:text=Only%20about%2015%25%20of%20used,climate%20change%20and%20pollutes%20waterways.
22. Ibid.
23. Ibid.
24. Ibid.
25. Higg. “An Introduction to MSI.” User Resources: How To Higg. Accessed April 2, 2023. https://howtohigg.org/higg-msi/an-introduction-to-msi/#:~:text=The%20Higg%20MSI%20is%20a,sustainable%20choices%20during%20materials%20selection.
26. Dean, Christina, “Waste – Is It 'Really' in Fashion?” Waste – is it 'really' in fashion? . Fashion Revolution, 2020. https://www.fashionrevolution.org/waste-is-it-really-in-fashion/.

Works Cited

27. Manshoven (VITO), Saskia, Maarten Christis (VITO), An Vercalsteren (VITO), Mona Arnold (VTT), Mariana Nicolau (CSCP), Evelyn Lafond (OVAM), Lars Fogh Mortensen, and Luca Coscieme, “Textiles and the Environment in a Circular Economy.” *European Topic Centre on Waste and Materials in a Green Economy*, November 2019, 14–15. https://ecodesign-centres.org/wp-content/uploads/2020/03/ETC_report_textiles-and-the-enviroment-in-a-circular-economy.pdf.
28. Gips, Terry, “Natural Step Framework.” Alliance for Sustainability, October 19, 2021. https://afors.org/about/natural-step-framework/.
29. Kent, Sarah, “Should Fashion Pay for Its 'Waste Colonialism'?” The Business of Fashion. The Business of Fashion, February 15, 2023. https://www.businessoffashion.com/articles/sustainability/fashion-pay-waste-colonialism-secondhand-clothes-epr-kantamanto/.
30. “Our Approach: The Natural Step Framework.” The Natural Step, June 19, 2019. https://thenaturalstep.org/approach/.
31. Becque, Renilde, “Backcasting: A Roadmap to Transformational Change.” Sustainable Brands, January 16, 2015. https://sustainablebrands.com/read/new-metrics/backcasting-a-roadmap-to-transformational-change.
32. Opperskalski, Sophia, Amy Franz, Andrea Patanè, SuetYin Siew, and Evonne Tan. “Textile Exchange Preferred Fiber & Materials Market Report.” Preferred Fiber And Materials Market Report. Textile Exchange, October 1, 2022. https://textileexchange.org/app/uploads/2022/10/Textile-Exchange_PFMR_2022.pdf.
33. “TM212 Fiber Fragment Release during Home Laundering.” AATCC. American Association of Textile Chemists and Colorists. Accessed February 26, 2023. https://members.aatcc.org/store/tm212/3573/.
34. “TEDx Speaker Guide.” TED Manuals. Accessed March 23, 2023. https://storage.ted.com/tedx/manuals/tedx_speaker_guide.pdf.
35. Plastics, Professor. “Polyester: Not Just Your Father's Leisure Suit.” Plastics Make It Possible, October 24, 2018. https://www.plasticsmakeitpossible.com/whats-new-cool/fashion/types-of-fabric/polyester-not-just-your-fathers-leisure-suit/#:~:text=Polyester%20plastic%20was%20discovered%20in,fiber%20in%201941%20called%20Terylene.

APPENDICES

Appendix A

CORPORATE RESPONSIBILITY
ESG ANALYSIS, PART 1

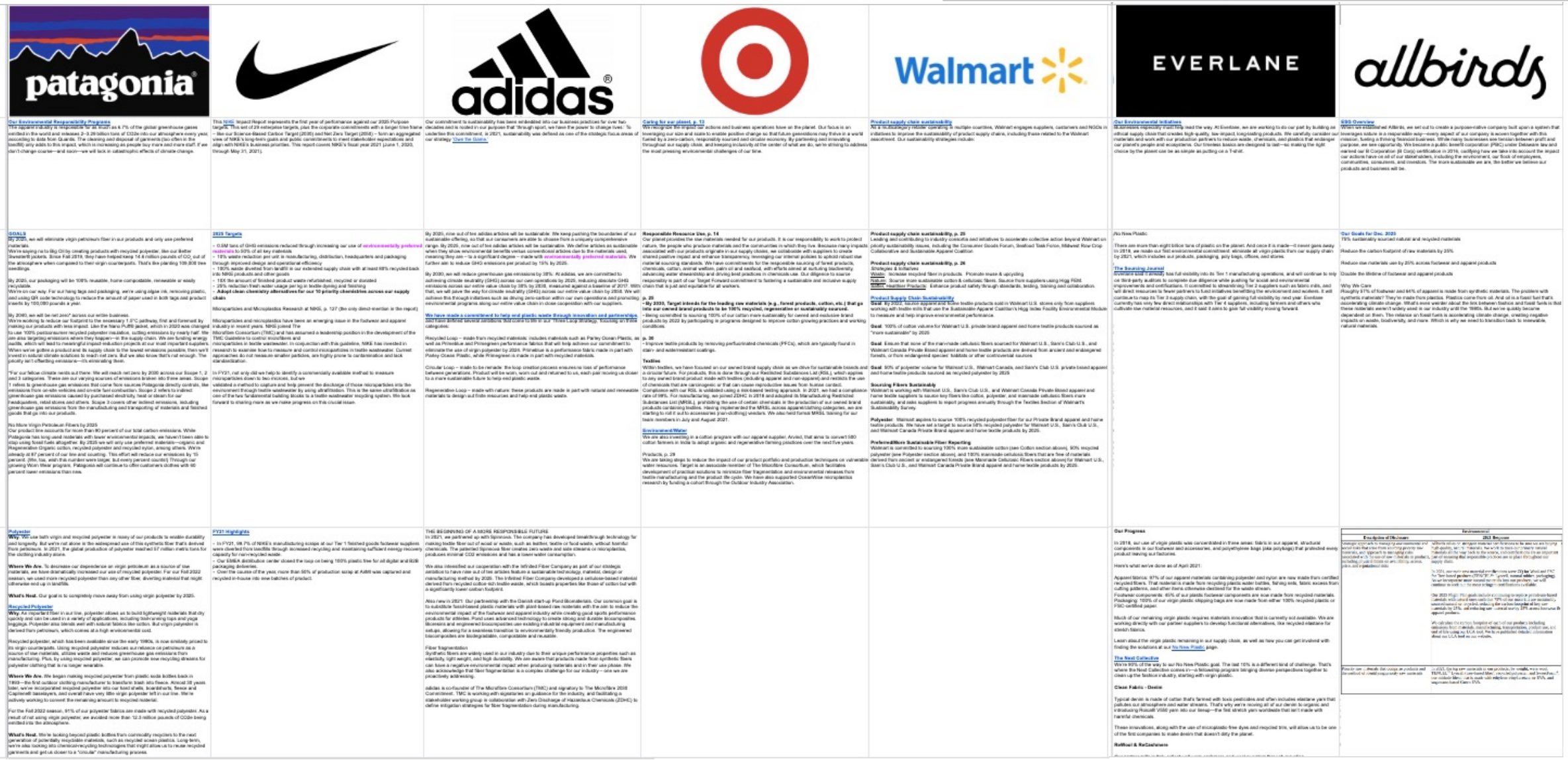
Key Takeaways:
Similar language is used in ESG reports for similar brands, ie. Nike and Adidas, Target and Walmart, and brands built with a foundation in sustainability like Everlane and Allbirds.

Some companies speak to microplastics specifically, others not at all.

INTRODUCTION

GOALS

PROGRESS



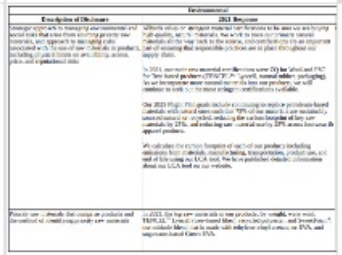
Appendix A

CORPORATE RESPONSIBILITY
ESG ANALYSIS, PART 2

INTRODUCTION

GOALS

PROGRESS

allbirds	SHEIN	ZARA	KERING	PVH
	We believe that we currently stand in a moment of opportunity. Stakeholders are more vocal than ever and there is a high demand for change across the fashion industry, which gives us a chance to develop initiatives that prove our commitment to responsible corporate citizenship. We are piloting a number of exciting first-of-its-kind initiatives from logistics to recycling, which will reduce waste at every stage of the product lifecycle. In addition, we are growing our partnerships with NGOs to support on-the-ground work aligned with our values.			
	**Responsible Sourcing Program** We have created the SHEIN Responsible Sourcing (SRS) evaluation system and conduct regular supplier audits. SHEIN's Responsible Sourcing Program assigns grades of A, B, C, D and Zero Tolerance Violations (ZTVs) to factories based on audit results. Examples of ZTVs include forced labor, serious environmental pollution, severe health and safety violations, and underage labor. SHEIN provides capacity building training to suppliers to support the remediation of ZTV and other major Code violations. Should suppliers fail to remediate violations within the allowed timeframe (immediately in severe cases, such as underage labor), we take further action, including termination. In 2021, we contracted third-party agencies, such as Openview and ITS, and used our trained staff to conduct nearly 700 audits of SHEIN supplier facilities using SEDEX SMETA and SRS Program standards. We will continue to conduct regular audits to ensure that all levels of the supply chain are compliant with the SHEIN Code of Conduct, accessible here.			
				

Key Takeaways:
Luxury brands like Kering and PVH gave specific information regarding microplastics mitigation. Is this because they have the money to create thorough reports and access to testing? Or are they some of the biggest contributors to microplastic pollution?

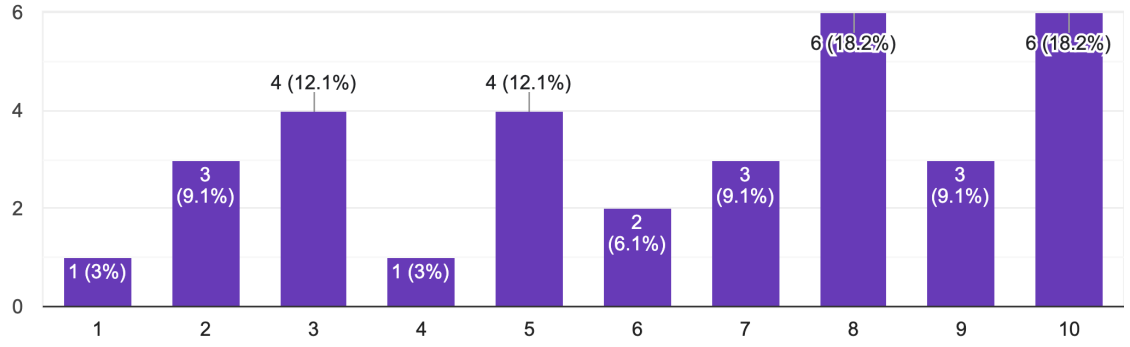
SHEIN used buzzwords in their report and made no mention of microplastics despite their reputation as one of the largest fast fashion brands. Interestingly, their report was a series of .png files rather than a PDF like all other brands in this comparison.

Appendix B

SPECIFIER SURVEY:
PART 1, THE DESIGN PROCESS

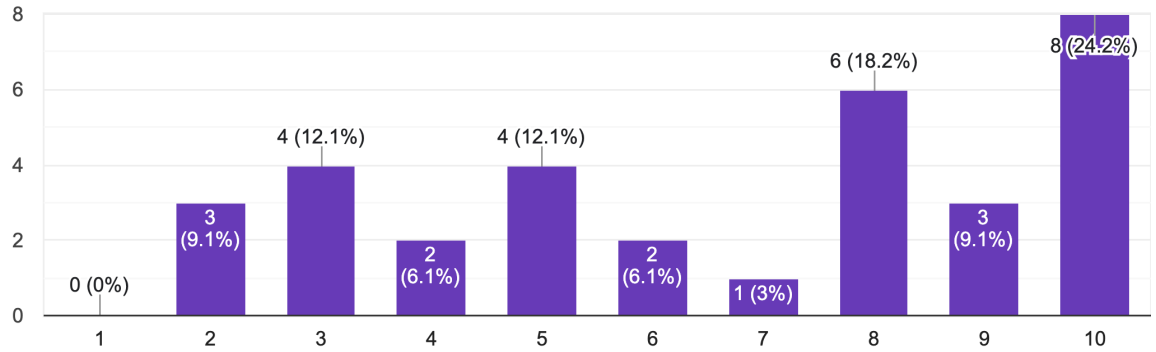
1 To what degree are the end of life impacts of a product a consideration in your design process?

33 responses



2 How often in the design process do you consider the end of life of a product?

33 responses



3 Tell me more about your design process / what are the factors that you consider when specifying materials?

Common Responses				
Trend • Design • Aesthetic	Raw material availability • Lead Time • Manufacturing location • Minimum Order Quantities (MOQs)	Cost	Performance capabilities: • Machine washable	Quality • Sustainability is often secondary

Key Takeaways:

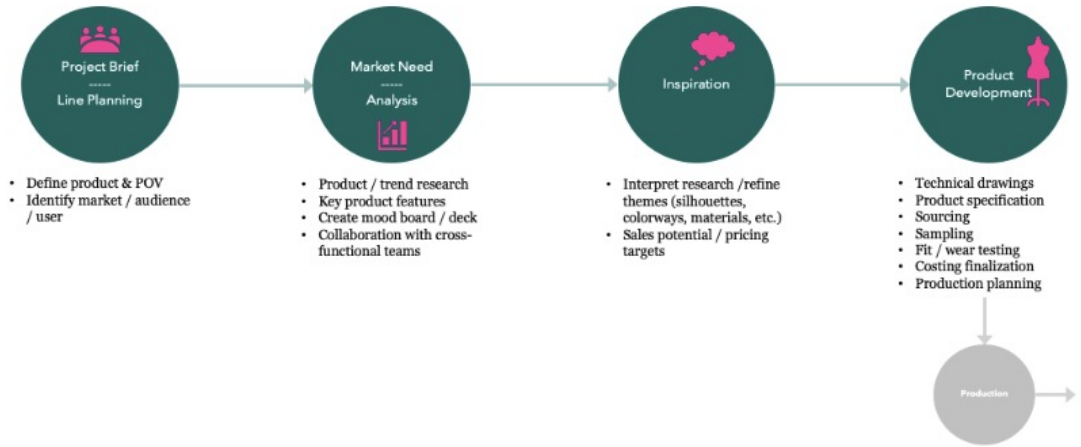
- About half of all designers consider end of life impacts of their product assortment during the design process.
- Trend, material availability, cost, performance, and quality are top considerations in material specification.

THE DESIGN PROCESS:
QUESTION 4 ON NEXT SLIDE

Appendix B

SPECIFIER SURVEY:
PART 1, THE DESIGN PROCESS

4 The Design Process from ideation to pre-production.



Take a look at this Process Map and consider where you encounter resistance to sustainable material specifications. Note who is resisting and why they are resisting. Record your response below.

Common Responses			
Project Brief • All CFTs • Merch teams	Market Need • Cost constraints • Sales team & buyers	Inspiration • Pricing targets • Line planning • Material requirements	Product Development • Sourcing • Sampling • Production

Key Takeaways:
- Barriers are encountered across all steps of the design process.
- Cost constraints are one of the main barriers.
- Cross-functional teams show resistance throughout.

MATERIALS SPECIFICATION:
QUESTIONS ON NEXT SLIDE

Appendix B

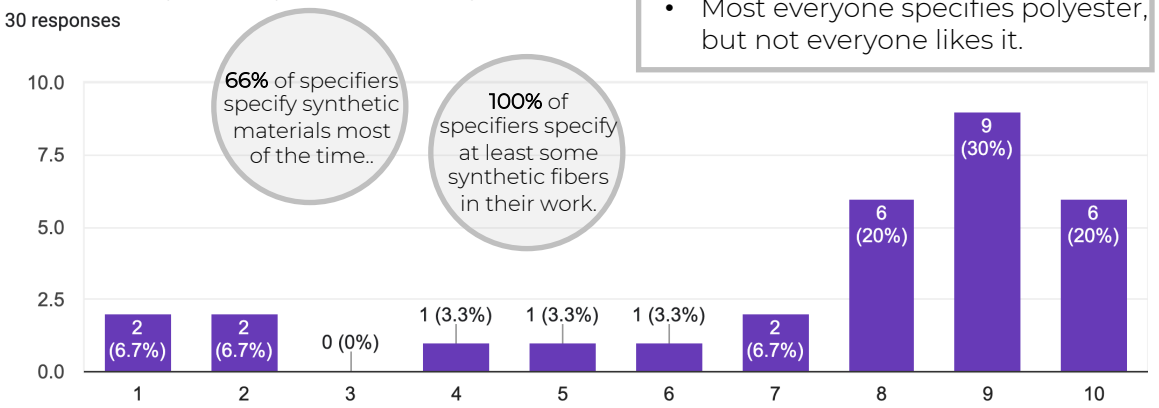
SPECIFIER SURVEY:
PART 2, MATERIALS SPECIFICATION

Key Takeaways:
- Most interviewees specify synthetic fibers in their designs
- Performance, cost, dye absorption, and durability are common appealing characteristics.
- Most everyone specifies polyester, but not everyone likes it.

5 What materials do you most often use for the products you design? (Polyester, Cotton, Nylon, etc.)

Common Responses				
Synthetic Fibers: Polyester Nylon rPET Spandex PU	**Plant Fibers:** Cotton Bamboo	**Animal Fibers:** Leather Lambswool Cashmere Merino wool Silk	**Semi-Synthetic:** Lyocell/Rayon	**Bio-Based:** Modal Tencel

6 How often do you use synthetic fibers in your designs?



7 If you specify synthetic fibers, why do you specify polyesters?

Common Responses			
Performance • Outerwear design/development • Moisture-wicking • Functional • Durability	**Business** • Cost effective • Cheap	**Characteristics** • Drape • Easy to dye	**Other** • rPET – recycled option

8 What are the attributes of polyester that you like?

Common Responses			
Performance • Durability • Moisture-wicking • Shape retention	**Business** • Cheap • Fast	**Characteristics** • Color fastness • Dye absorption • Hand feel • Lightweight • Breathable • Abrasion-resistant • Easy care	**Other** • Don't like it, but have to use it due to business constraints • Long lifetime • Everything! • Versatility

Appendix B

SPECIFIER SURVEY:
PART 2, MATERIALS SPECIFICATION

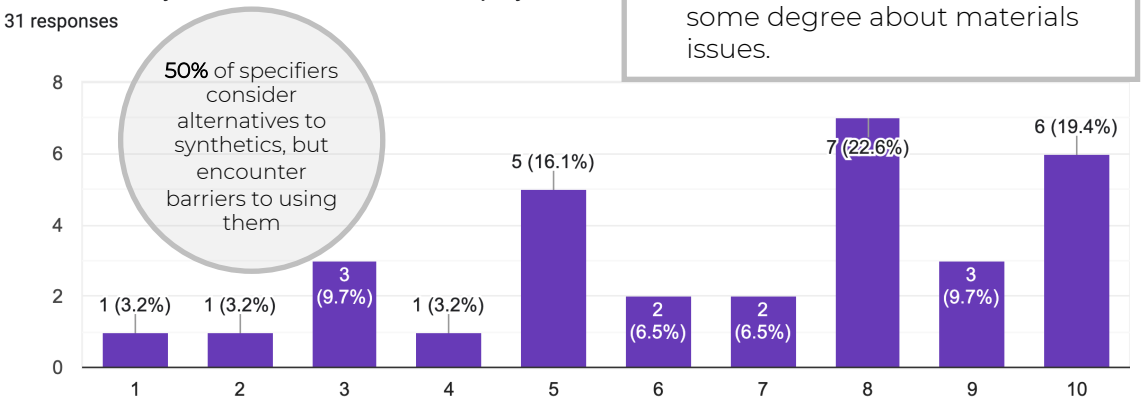
Key Takeaways:
- While synthetic fibers have desirable characteristics, specifiers are aware of their harmful effects on the biosphere and specify them anyway.
- All specifiers are concerned to some degree about materials issues.

9 If you specify synthetic fibers, why do you specify polyesters?

Common Responses			
Performance • Outerwear design/development • Moisture-wicking • Functional • Durability	**Business** • Cost effective • Cheap	**Characteristics** • Drape • Easy to dye	**Other** • rPET – recycled option

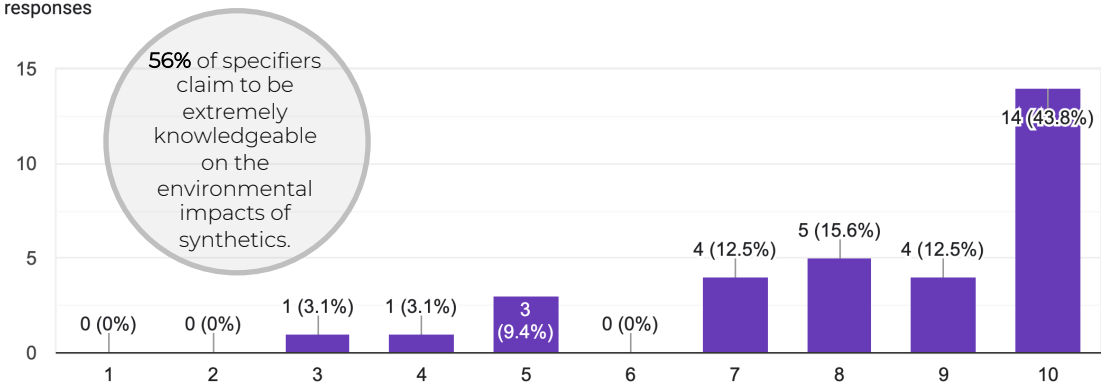
10 How often do you consider alternatives to polyesters?

31 responses



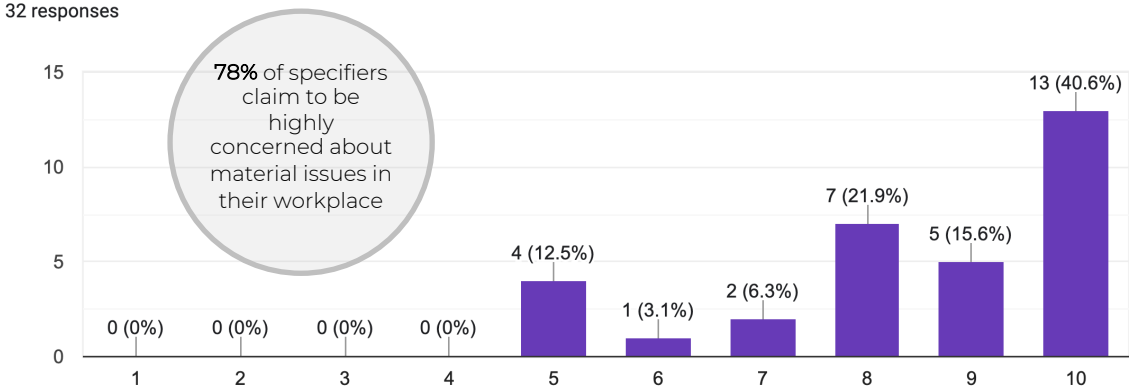
11 How familiar are you on the environmental impact of synthetic fibers like polyester?

32 responses



12 To what degree are you concerned about materials issues in your workplace?

32 responses



Appendix B

SPECIFIER SURVEY:
PART 2, MATERIALS SPECIFICATION

Key Takeaways:
- As one specifier mentioned: "there is no standardized definition of 'responsible materials' so it could be interpreted in many ways."

13 What does the phrase "responsible materials" mean to you?

Common Responses			
Lifecycle • Low carbon footprint • Lifecycle considerations • Circularity • Encompassing end of life • Recycleable	**Sourcing** • Ethically sourced • Human and social cost accounted for • Traceability • Country of origin	**Material Characteristics** • Natural • Biodegradable	**Other** • Non-trend dependent • Longevity • No standardized definition

SPECIFICATION BARRIERS:
QUESTIONS ON NEXT SLIDE

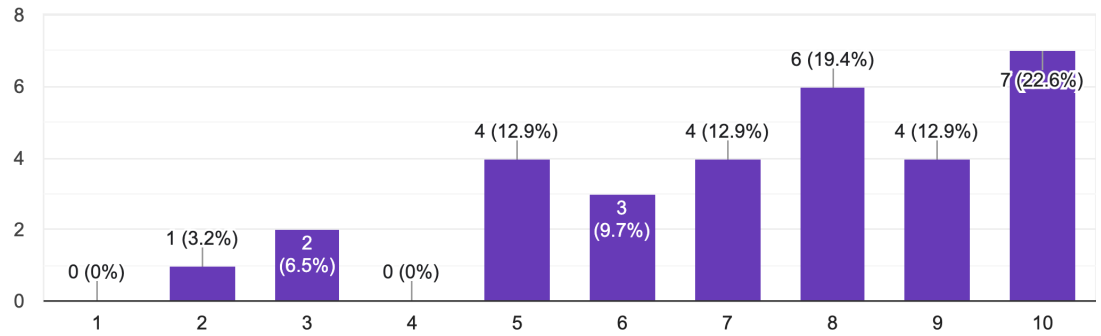
Appendix B

SPECIFIER SURVEY:
PART 3, SPECIFICATION BARRIERS

Key Takeaways:
- Four main barriers: Availability, Cost, Transparency, Durability.
- Specifiers mention consumer demand is a barrier, but have they been given better options?

14 To what degree do you encounter barriers in specifying responsible materials?

31 responses



15 Explain the types of barriers you experience.

Common Responses			
Availability • Lead times • Minimums • Color limitations	Cost • Tarriffs	Transparency • Compliance • Greenwashing • Accurate scientific measurement	Durability • Performance • Functionality • Technical limitations

16 What do you see as the one, most impactful, barrier to specifying more responsible materials?

Common Responses			
Availability • Lead times	Cost • Tarriffs	Performance • Chemistry	Mindset • Designers (not thinking of end of life) • Consumers (not demanding better)

17 Where do you believe this barrier stems from?

33% of specifiers mention consumer demand as a barrier.

Common Responses			
Availability • Few alternatives in activewear/swim • Economies of scale	Cost • Tarriffs	Mindset • Immediate need • Disposable mindset • Assumed increased cost	Other • Capitalism • Lack of research for new science • Lack of consumer demand • Consumer culture

Appendix B

SPECIFIER SURVEY:
PART 3, SPECIFICATION BARRIERS

Key Takeaways:
- Few specifiers use tools like Higg, most rely on internal sources.

18 What tools or resources are available to you regarding material selection and testing?

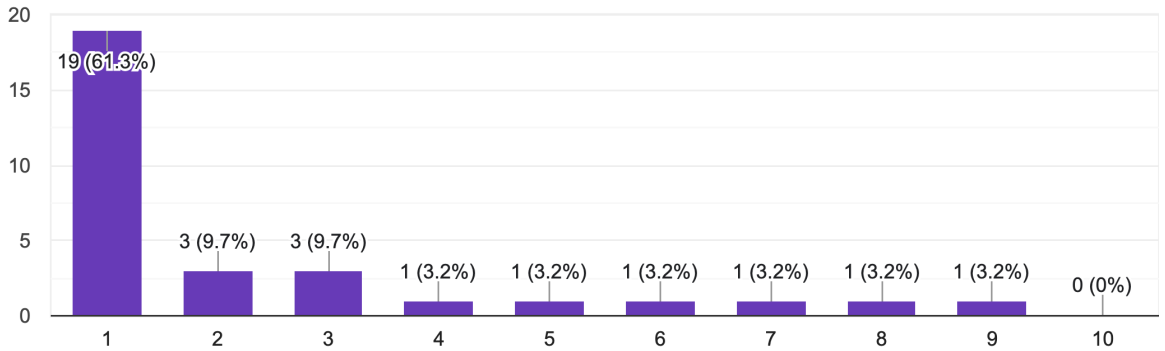
Common Responses		
Internal Resources • Materials library • Materials team • Online database	External Resources • Mills/suppliers • Trade shows • Higg	None

19 What are the limitations to these resources?

Common Responses			
Availability • Time	Cost	• Assumptions • Evolving understanding of what "impact" and "responsible" mean	None

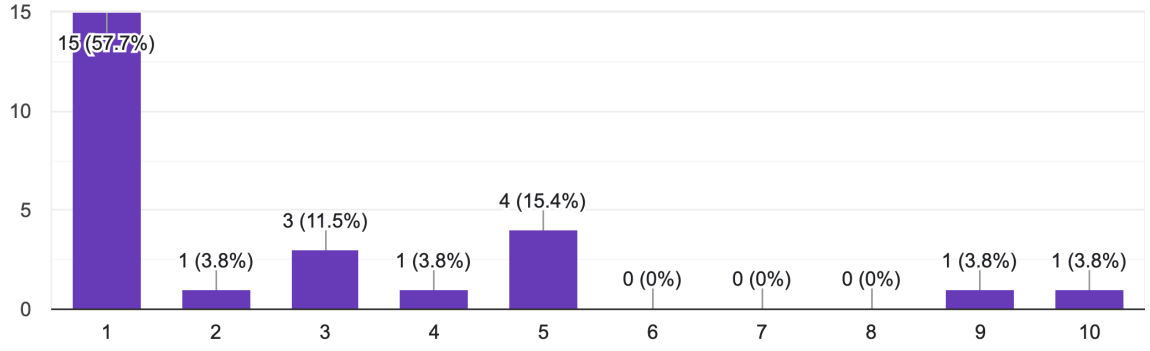
20 Do you use the Higg Materials Sustainability Index (MSI)? If so, how frequently?

31 responses



21 How useful is the Higg MSI to you?

26 responses



Appendix B

SPECIFIER SURVEY:
PART 4, MATERIALS RESOURCES

22 If you have received good education/information/resources on materials specification where did you find it?

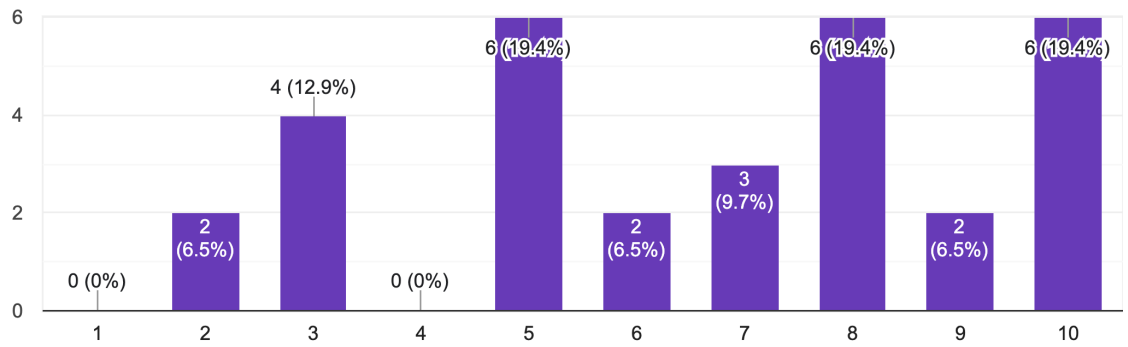
Common Responses			
Public Resources • Books • Articles • Ellen MacArthur Foundation • Suppliers/manufacturers	Trade Shows • Functional Fabric Fair	Memberships • Bluesign • Higg • Material Exchange • Cotton Inc. • Textile Exchange • Outdoor retailer • Low Impact Alliance	Self-directed • Ask questions • Instagram • College/education • Personal research • Google • Linkedin • CFTs • Years of experience

23 What resources do you *wish* were available to you?

Common Responses			
Dedicated Team • Research/test/source • Research and Development budget • Collaborative partners (ie. Recycling facilities)	Library • Visibility into what is available by region • New materials at no added cost • Impact list • Integration of this subject matter into the IFAI resources	Data • Pilling • Lifespan • Recylability • Material impact in PLM system • Universal standards • Reliable data • Transparency	Training • A way to share with others the benefits of using better materials • Total picture • Consumer end of life visibility • Information shared with consumers. • Master Class

24 To what degree do you feel supported in making materials recommendations?

31 responses



Key Takeaways:

- Specifiers seek out information that isn't readily availaable, but they are curious for more.
- Great ideas for partnerships and an emphasized need for data collection and a desire for more education.

Appendix B

SPECIFIER SURVEY:
PART 5, DEMOGRAPHICS

25 What is your role within your organization?

Common Responses

- Founder / CEO
- Fabric Engineer
- Principal, Responsible Materials
- Fit & Technical Design
- Designer
- Product Developer
- Assistant Designer
- Patternmaker
- Sourcing Manager
- Trend Design
- Creative Director
- Product Director
- Design Strategist
- Product Line Director

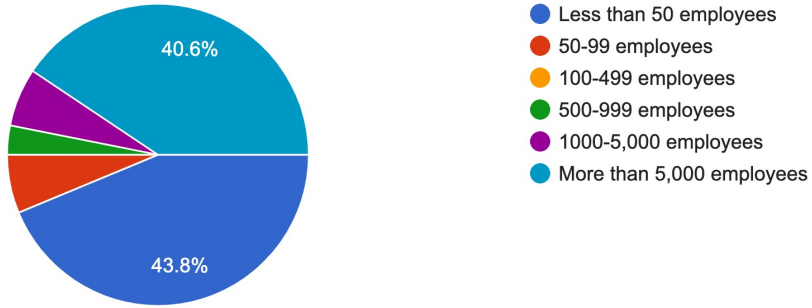
27 Where is your organization located?

Common Responses

- Colorado
- Texas
- Oregon
- California
- Minnesota
- New York
- North Carolina
- Ohio
- Arkansas

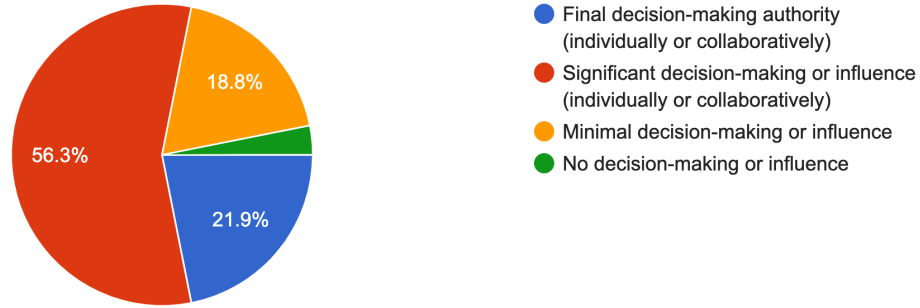
26 What is the size of the organization you work for?

32 responses



28 What level of decision-making authority do you have in materials specification?

32 responses



Appendix C

CASE STUDIES
PART 1: DISCOVERY

1 Connecting Values

Begin by evaluating your values as a designer, the values of your organization, the values of the industry, and the values of your customer. Where do these values align? Is there a disconnect? Does your organization have goals to specify better materials?

- Ethics
- Professionalism
- Human / basic needs
- Brand / organizational

Tasks:
1. Observe (and take notes)
2. Make Lists

Specifier Notes and Feedback::

Include a space for the user to establish a goal and/or write what they are hoping to discover using these exercises.

Case Study #1: Replace 100% Poly Faux Shearling

In this case study, the user is seeking an alternative to a 100% poly faux shearling. Ideally – similar properties and competitive cost.

Personal ethics:
- Good design, long-lasting product.
- Repairable.
- Avoid synthetics, if possible.
- Made in a factory where employees are paid fair wages and have safe working conditions.

Brand ethics:
- Affordable, on-trend options for the guest.
- Quickest, cheapest option.

Customer:
- Giftable, affordable, ships quickly
- Materials are sometimes a consideration

Alignment: Quality is important.

Disconnect:
- No consideration of end of life material impacts.
- The product is niche and does not fulfill a basic need. Rather, it's a unique gift that has a functional purpose.

Goal: To design a product that will meet the design brief and allow for 30%+ profit while considering impacts at all stages of development to end of useful life.

Risk Assessment

Limitations:
- Materials with desired properties.
- Lead times

Barriers:
- Availability
- Cost

Risk of not acting:
- Microfibers released with production and use.
- Mostly during production, risking exposure for the production team.

Case Study #2: Eliminate Rayon

No formal goals to specify materials. Personal interest from head of sourcing to eliminate certain fibers in the supply chain.

Personal: human rights w/ in supply chain, eliminating certain fibers w/ negative environmental impact.

Disconnect: human rights and fair wages at the factory level

Risk Assessment

Limitations:

Barriers:
- Cost.
- Not always able to specify materials, ie. reorders

Not acting:
- Multiple stakeholders - not supported by the greater org

Appendix C

CASE STUDIES
PART 1: DISCOVERY

2 Stakeholders

Consider the stakeholders involved. Be sure to include the environment. Take a whole systems approach. Create a mind map, a visual representation. Where do you see possible areas of intervention?

- Colleagues
- Industry peers
- Partners/Suppliers
- Consumers

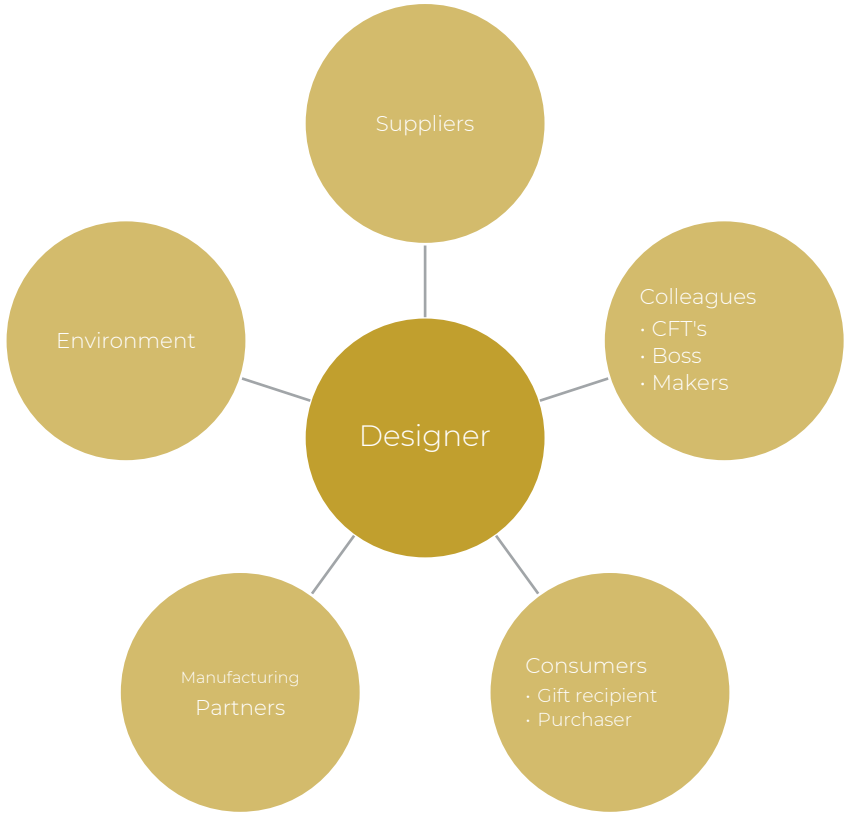
Tasks:
1. Mind Map
2. Engage with someone new
3. What else?

Specifier Notes and Feedback::
Also ask:
Who are the champions?
Who are the decision makers?
Find motivation behind decision makers to see how to align with ethics from first slide
Have conversations/avoid making assumptions
Making conversations a priority. Assign time to it.

Case Study #1: Replace 100% Poly Faux Shearling

Industry:
- Vendor network
- Bosses
- Colleagues
- Industry peers
- Industry groups
- Industry leaders

Other stakeholders
- Consumers
- Social network



Risk Assessment
Limitations
- Time

Barriers
- Do not have a vendor list for similar materials
- Specific vendor for existing materials not helpful

Risk of not acting
- Microfibers released with production and use.
- Mostly during production, risking exposure for the production team.

Case Study #2: Eliminate Rayon

- Designers
- Sourcing team
- Production
- Factory partners
- Factory workers
- Local community (near factory)
- Retailer/client
- Consumer

Champions: head of sourcing & design
Decision Makers: VP of design, head of sourcing, buyer/retailer

Risk Assessment
Limitations:

Barriers:

Not acting:
- Will there be any adverse effects from specifying?

Appendix C

CASE STUDIES
PART 1: DISCOVERY

3 Education

What more would you like to learn? Where do you notice gaps in knowledge across your organization? Consider the type of information: supply chain, scientific, consumer needs, etc.

- Peer-to-peer
- Brand owners/CEOs
- Decision-Makers
- Investors
- Consumers

Tasks:

1. Use brainstorming tools
    a. List Making
    b. SWOT analysis
    c. Lotus blossom technique

Specifier Notes and Feedback::

Team member education - huge gaps and the learning process/curve can be challenging. How to bridge this gap?

Case Study #1: Replace 100% Poly Faux Shearling

Educate self:

- What are the impacts of producing faux shearling (poly), faux shearling (cotton), genuine shearling?
    - Consider where the material is made
    - What is the fiber make-up?
    - What are the production methods?
        - Cut with shears or laser?
- Use an alternative material all together? Felt?

Connect with a vendor and ask questions

- Collect MSDS, safety requirements
- Information about material origin or social responsibility?
- Consider the full system

Risk Assessment

Limitations

- Time
- Construction
- Product use-case (material is used in 3 different products)

Barriers

- Knowledge among peers
- Need to change the construction of the product

Risk of not acting

- Microfibers released with production and use.
- Mostly during production, risking exposure for the production team.

Case Study #2: Eliminate Rayon

Report of basic facts

- Existing organizations that could be partnered with
- Ask sourcing team to pull together baseline data

No one had knowledge in this space

- Head of sourcing knew the basics. Less concerned about chemicals used in finishing. Need a full map or full picture.
    - Painting this picture would be useful

Risk Assessment

Limitations:

- Time

Barriers:

- No supplemental materials. Cotton not a good alternative

Not acting:

- Lagging behind the industry

Appendix C
CASE STUDIES
PART 2: PLANNING

4 Define

Your definition and brand standards of quality and durability:

- Do these standards fall short?
- What can be improved?
- What is durability?
- Is it defined the same across your org.?
- Across the industry?

Tasks:

1. Conduct a Survey or Interviews
    a) Peers
    b) An adjacent team

Specifier Notes and Feedback::

Forming partnerships with other teams, ie. QA teams and being familiar with retailer standards

Case Study #1: Replace 100% Poly Faux Shearling

Consider brand standards

- We make product as a small manufacturer.
- Limited to the resources we have discovered on our own.
- No internal testing methods.
- Not a major retailer.

Risk Assessment

Limitations

- Time
- Resources

Barriers

- Knowledge among peers
- Need to change the construction of the product

Risk of not acting

- Microfibers released with production and use.
- Mostly during production, risking exposure for the production team.
- Implications of product at end of useful life. What happens to it?

Case Study #2: Eliminate Rayon

Quality/Durability

- What would pass retailers QA
    - Dictated by retailer
    - Wash testing
    - Color matching
    - Weight standards
- Anything missing?
    - Fading print/art - trend dependent

Complaints - retailer would ask for money back

- Vendor standards fell short, asked for money back

Risk Assessment

Limitations:

Barriers:

- Having to pay extra money if there were issues

Not acting:

Appendix C

CASE STUDIES
PART 2: PLANNING

5 Test & Analyze

Testing methods.
- What is measured now?
- What should be measured?
- What would it take to test microfiber release?
- ASTM or AATCC TM212[1] standards for microfiber release
- LCA's
- KPI's

Tasks:
1. Identify testing methods
    a) What is currently in use?
2. Measure a new KPI
    a) i.e. Where testing may fall short

Specifier Notes and Feedback::

Encourage a different way to look at testing – to understand impact, not just garment or material performance.

Case Study #1: Replace 100% Poly Faux Shearling

KPI's
- No specific measures on materials
    - Only sales
- Leather is from North America, canvas is greige imported from India. No further knowledge of social compliance on this material.
- Shearling origin unknown
- What should we measure?
    - Microfiber release – how to measure?
- Testing – we wear-test our product, but not extensively
    - Do not rely on vendors to test for us
    - No abrasion testing, no microfiber release testing
    - What options are there
- No laundering required, spot clean only. Shearling unlikely afftected.

Risk Assessment

Limitations
- Time
- Resources

Barriers
- Knowledge among peers
- Need to change the construction of the product

Risk of not acting
- Microfibers released with production and use.
- Mostly during production, risking exposure for the production team.
- Implications of product at end of useful life. What happens to it?

Case Study #2: Eliminate Rayon

Measure baseline
- Wash testing
- Color matching
- Weight standards

No LCA's were done, but this could be useful

*Testing was not measured with the mindset of understanding impacts.

Risk Assessment

Limitations:

Barriers:

Not acting:

Appendix C

CASE STUDIES
PART 2: PLANNING

6 Specify & Inform

Information-sharing:
- How are synthetic materials communicated?
- Additives and finishes?
- Data
- What is the messaging behind specification?
- Avoid greenwashing
- Ask yourself: where did I compromise?"
- What can I do to make sure this fiber will shed the least?

Tasks:
1. Identify an alternative
2. Establish baseline, goals, and timeline

Specifier Notes and Feedback::

Establishing a baseline, goals, and a timeline for those goals could provide a clearer vision

Case Study #1: Replace 100% Poly Faux Shearling

We use keywords to gain visibility via SEO
- How much of this is greenwashing?
- Some product listings are inaccurate, ie. Using keywords for upcycled/recycled content when it's not

Use clear language without buzzwords
- How to maximize SEO without being misleading?
- Products using faux shearling – consider adding fiber content for more accuracy.
- What are the alternatives?
- Basic chemistry – as a vendor for more information

SWOT on specifying a new material:

STRENGTHS	WEAKNESSES
• Fewer synthetics in product assortment	• Possible costing issues • Possible material additives may cause for materials to be less sustainable
OPPORTUNITIES	**THREATS**
• Possible new vendor • Can speak to 100% cotton (or natural) fiber usage	• Time to accomplish • Change construction/design of the product • Impact on 3 SKUs

Risk Assessment

Limitations:
- Time
- Resources

Barriers:
- Need to change the construction of the product
- Need to reframe product descriptions

Risk of not acting:
- Microfibers released with production and use.
- Mostly during production, risking exposure for the production team.
- Implications of product at end of useful life. What happens to it?

Case Study #2: Eliminate Rayon

Establish the baseline
Establish the end goal and then steps in between.
Give a 3-year timeline

Suggesting something to feel less scary. Needs to be a decision made with all stakeholders/decision makers.

Risk Assessment

Limitations:
- Time
- Capacity
- Accuracy of Information/transparency
- Cost to test for MF shedding

Barriers:
Not acting:

Appendix C

CASE STUDIES
PART 3: IMPLEMENTING

7 Employ the Precautionary Principle

What are the current systems at play? When you make a choice make it a good one, not an alternative bad one. Take a step back and think of the whole system. Where are the impacts? Will this problem push the issue further downstream?

- Understand basic chemistry
- Use the TNS funnel
- Good vs. less bad

Tasks:
1. Practice backcasting

Specifier Notes and Feedback::

Create an impact chart of each fiber or core fabrics.
Create red list of materials.

Case Study #1: Replace 100% Poly Faux Shearling

Precautionary principle:
- I know polyester is bad and can see visible fiber release every time the product is touched or moved.
- How is an alternative shearling better? Is it simply less bad? Would it be better to consider an alternative completely? Would give similar properties?
- Felt? Cotton? Should be soft with a high pile. Domestically sourced. Undyed o.k. Treatment is not necessary as there aren't safety concerns.

Backcasting:

Future: Product made of 100% cotton, both exterior and material lining – no additives to fiber. Natural dyes only or undyed.

Work backward from here...

Case Study #2: Eliminate Rayon

Establishing baseline
- Fixated on eliminating rayon and replacing with cotton. Not considering the impacts of cotton and treatment with different finishes.

Chart of impact of each fiber of core fabrics.

Because of costing and volume, no access to plant-based fibers that were too expensive.

Risk Assessment

Limitations
- Time
- Low-pricepoint, low-volume item

Barriers
- Visibility into full material make-up. Will the vendor have all information on additives, material origin, etc?

Risk of not acting
- Microfibers released at all stages
- Mostly during production, risking exposure for the production team.
- Implications of product at end of useful life. What happens to it?

Risk Assessment

Limitations:
- Cost
- Timing

Barriers:
- Not Acting:
  Not having alternatives. Event ually retailers will ask for options, if not prepared, risk losing the business

Appendix C

CASE STUDIES
PART 3: IMPLEMENTING

8 Collaboration

Revisit your network from Phase 1. Establish partners on a given project/barrier/issue. How can you work together to inform, educate, and persuade the remaining stakeholders?

- Revisit network
- Establish partners
- Create a meeting cycle

Tasks:
1. Identify and engage partners
2. Form a group or join an existing group

Specifier Notes and Feedback::

Case Study #1: Replace 100% Poly Faux Shearling

- Consider my network – who to involve from my org? Anyone? TBD.
- Connect with vendors/Take learnings and apply/share with colleagues. TBD.

Risk Assessment
Limitations
- Time

Barriers

Risk of not acting
- Microfibers released with production and use.
- Mostly during production, risking exposure for the production team.
- Implications of product at end of useful life. What happens to it?

Case Study #2: Eliminate Rayon

Revisit the network with data. Have conversations at the top, ie. retailer.

Identify an interest that would be motivating for rest of stakeholders
- Understand base fabrics
- Identify baseline
- And have data prepared

Risk Assessment
Limitations:

Barriers:

Not acting:

Appendix C

CASE STUDIES
PART 3: IMPLEMENTING

9 Reduction

The Earth has limits, it is degrading and cannot continue this plan/pace/path. Climate change tells us this.

- TNS Funnel - visualize the demand and constraints
- Slow the cycle
- Consider made-to-order approach

Tasks:

1. Use data to inform and reduce
    a) Identify underperforming SKUs early

Specifier Notes and Feedback::

Trend-proof, long-term planning

Case Study #1: Replace 100% Poly Faux Shearling

Consideration of TNS Funnel

- I work for an organization that has flexibility in the design cycle. Yet I wear many hats, so design is often rushed. How can I leverage my partners/colleagues to ensure quality?

Slow the Cycle

- How is possible in my org? Emphasizing quality, long lasting products. An opportunity to redefine durability. I like to repurpose designs and tools across SKUs. How can I do more?

Risk Assessment

Limitations

- Time

Barriers

Risk of not acting

- Microfibers released with production and use.
- Mostly during production, risking exposure for the production team.
- Implications of product at end of useful life. What happens to it?

Case Study #2: Eliminate Rayon

Producing more than what the guest actually bought.

Anything could do to mitigate overproduction?

- Made to order program with graphic tees. Printed in MX vs. China.
- Test-out tees in warmer weather

Product insights - create solutions not grounded in trend

Get creative with testing/matching consumer needs/made to order

Risk Assessment

Limitations:

Barriers:

- Quickly shifting landscape

Not acting:

- Continued over-production

Appendix C

CASE STUDIES
PART 3: IMPLEMENTING

10 Innovation

Leverage suppliers and your network. What is one thing you can do today to move the needle toward your goal?

- What is one thing you can do now?
- Next month?
- Next year?

Tasks:

1. Start planning early
    a. Create a forward-thinking plan for future iterations and next steps
    b. Establish goals

Specifier Notes and Feedback::

Include a page for final presentation:

- 1-page vision/strategy share-out with partners
    - Assign key partners
    - Assign key action items
    - From vision to plan
- Mind map in the beginning is important
- Understand who you are answering to and their goals.

Case Study #1: Replace 100% Poly Faux Shearling

Ask questions to determine if innovation is feasible. (I can think of other products that I could apply this to, but perhaps not in this instance.)

Goal-setting

- Goal for today: make a list of vendor questions.
- Goal for this month: to a side-by-side cost analysis for faux vs. genuine shearling, research x1-2 alternatives to both

Risk Assessment

Limitations

- Time

Barriers

Risk of not acting

- Microfibers released with production and use.
- Mostly during production, risking exposure for the production team.
- Implications of product at end of useful life. What happens to it?

Case Study #2: Eliminate Rayon

Find companies that inspire from a materials standpoint.

- Leverage materials/contacts/support/suppliers
- Form partnerships

Share successes to motivate and inspire others

Risk Assessment

Limitations:

Barriers:

Not acting:

test