

Challenges and Opportunities in Sustainable Domestic Apparel Manufacturing: Insights from Found Surface

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November 20, 2023

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Executive Summary

This white paper, authored by Found Surface, a clothing company based in Cleveland, Ohio and powered by a wholly domestic supply chain, delves into the intricate challenges and potential solutions in achieving higher environmental and transparency goals in domestic manufacturing within the United States. The paper aims to present a balanced view of the barriers and prospects for small to medium-sized clothing brands in the U.S. striving for sustainable production. Through comprehensive research and first-hand experiences, the paper highlights key areas such as transparency and tracing, infrastructure, dyeing processes, material selection, worker ethics, consumer attitudes, consumption cycles, and waste management. Found Surface also includes a description of its own efforts in these areas and outlines future plans to continually improve its own standards. Ultimately, this paper suggests that the resurgence of domestic manufacturing through a framework of hyperlocal production can address many key issues related to the current state of fashion and garment production. Found Surface hopes this paper will serve as a starting point in an ongoing conversation about how clothing is made, and how it can be made better.

Background

Found Surface is a garment and fashion company bridging the gap between luxury and conscious consumerism by providing high quality, sustainably made domestic clothing. Beginning in October 2022, Found Surface was created using a holistic supply chain curated using equity driven domestic sources. Headquartered in the Slavic Village Neighborhood of Cleveland, Ohio, Found Surface represents a young, modern approach to one of the oldest industries in the world, with creative social ideals and values woven into the fabric all the way from the fiber to the final design.

Introduction

We are committed to improving the transparency and sustainability of our products and our business practices. As a small business with an entirely domestic supply chain, we have encountered many roadblocks in the pursuit of our ultimate vision, primarily caused by declines in the capabilities of domestic apparel infrastructure, both in terms of workforce and technology. Systemic roadblocks such as limited supplier transparency and poor communication further complicate these issues, as any but the largest brands lack the weight required to induce change. Our team has worked hard to identify and understand the biggest challenges to sustainable and transparent domestic manufacturing – Here is what we found:

Areas of Opportunity

1. Transparency and Tracing

Supply chain tracing and transparency are the foundations upon which all other efforts stand. Clothing brands and manufacturers cannot begin to work towards their ideals of ethical sourcing, workers' rights, and sustainability without first having access to all necessary information about their supply chain and making it publicly available. Fashion Revolution, an ethical fashion activism body that publishes a yearly Fashion Transparency Index, states that **transparency is the necessary first step to doing better**: “Transparency underpins sustainability – without transparency, achieving a sustainable, accountable and fair fashion industry will be impossible”[1].

As it stands, there is a lack of transparency from garment producers and manufacturers that prevents businesses and clothing companies from addressing root issues.

In 2023, the Fashion Transparency Index scored 250 brands on their transparency, with an average transparency score of 26% and only two brands achieving a score greater than 80%[1]. While these low scores are due in part to brands avoiding the disclosure of negative information to protect their image, it is also due to supply chain partners being unable to provide brands with necessary information.

Without any federal regulations or precedents requiring manufacturers to submit transparency data to their clients, the burden of acquiring information lies on the brand. This burden makes it especially difficult for any but the largest brands with the

largest order sizes to request data from their suppliers.

Found Surface built its supply chain with transparency, sustainability, and domestic production in mind – Our partners have been vetted to ensure they will work with us to provide transparency data, and our entirely domestic supply chain makes it easier to interface with our production partners quickly and efficiently. Found Surface endeavors to continue collecting relevant transparency data not only to provide our customers with useful information but also to aid in the continuous reduction of our products' impact.

2. Infrastructure

Choosing the right suppliers can be one of the most consequential decisions a brand can make, especially when prioritizing domestic, sustainable, and transparent production.

Found Surface's supply chain partners are selected based on our core values of a domestic and ethical supply chain, the use of low-impact, organic materials, and the relentless pursuit of transparency and accountability. Our garments are manufactured in facilities that prioritize environmentally friendly production practices, and we are confident that our garments represent the best that can be produced in the United States.

Found Surface's emphasis on domestic production synergizes well with our belief in producing consistently high quality and low impact garments with organic, circular materials. Our domestic supply chain helps us achieve this goal by reducing lead times, improving quality control, and reducing the environmental impact related to transporting goods between production steps.

However, the United States' garment production infrastructure is very small compared to what it once was: In 1960, about 95% of garments consumed by Americans were made domestically; Today, only 3.5% of garments meet this standard[2, 3]. This shift has resulted in the loss of a majority of the garment production knowledge and infrastructure that the United States once had. For example, Found Surface's hometown of Cleveland, OH was the fifth largest garment manufacturing hub in the United States in 1910, which allowed companies to turn raw materials into a finished product in one city[4]. Today, this infrastructure has been lost—the only step in the garment production process that can be done in Cleveland is the cut and sew of fabric into a ready-for-dye garment. This shift has been a general trend for the rest of

the United States—Even in cities that can still claim to have all steps of the production process nearby, the choices that a clothing brand has for each step are limited.

This makes it difficult for companies that want to prioritize sustainable production practices—Even if there is a sustainable option for a production step, it might not be near another step in the manufacturing process, or it might not be able to handle the production scale required by the client. Many clothing brands are left to choose a less-than-optimal production partner.

Using a global supply chain can broaden the sustainable choices available to brands, but it comes at the cost of more emissions related to transportation, which are often unaccounted for in the final carbon footprint calculation. The methods typically used to calculate the carbon emissions of a product often take average values for production processes that vastly underestimate, or even omit, the impact of international transportation. For example, Parsons et al. analyzed the impact of a T-shirt that was made in Cambodia and shipped to the UK; They found that simplifications in the garment's emissions calculation failed to account for as much as 15% of the T-shirt's carbon footprint[5]. When the true impact of a global supply chain is included in the impact of a product, the benefits of a fully domestic supply chain become more apparent.

Based on our experience with producing an eco-conscious product entirely in America, we recognize that in order to produce a truly sustainable product, we need more garment manufacturing infrastructure in hyperlocal hubs. The resources needed to build a regional garment manufacturing hub are beyond any one company's resources, yet it is our goal to realize this vision.

As part of our mission to reduce supply chain emissions and encourage hyperlocal production, Found Surface works with production partners clustered in three hubs located in Texas, California, and Ohio: Cotton growing and yarn processing are conducted in Lubbock County, Texas; fabric knitting, cut and sew, and garment dyeing are conducted near Los Angeles, California; small batch cut and sew, order fulfillment and distribution are conducted in Cleveland, Ohio.

3. Dyes

Dyeing and finishing processes comprise a large share of the water and carbon footprint of a garment's production, and the impact can vary widely depending on the processes and types of dyes used. As a result, understanding these processes is incredibly important for garment manufacturers to understand their impact and make improvements.

Many dyehouses, despite wanting to play a role in reducing their impact, do not have the necessary staff and incentive to gather transparency data for their clients or to pursue process optimization efforts. Thus, domestic clothing companies are limited in their efforts by the dye and finishing offerings from their suppliers.

All of Found Surface's clothing is garment dyed, which is the process of dyeing a garment after it has been cut and sewn into a finished piece. This process wastes less dye than piece dyeing, which is the process of dyeing the fabric before it has been cut and sewn.

Found Surface currently uses low-impact reactive dyes, which are the healthiest synthetic dyes for both the environment and your body. Reactive dyes have the best colorfastness for cotton, contain no heavy metals, and do not contain a mordant. The dyeing process also requires less energy, as it occurs at 30 degrees C compared to the 100 degrees C used in typical synthetic dyes. At the end of the process, dye wastewater is pre-treated before being sent to the regional wastewater treatment plant. Additionally, Found Surface prioritizes the use of dyeing facilities in California, as it has some of the most stringent water treatment standards in the country.

Natural dyes are the most desirable option for sustainably-minded garment manufacturers because they are derived entirely from plant sources with no added toxic chemicals. There is currently very limited infrastructure for natural dyes at a commercial scale in the United States. This lack of infrastructure makes it hard for garment manufacturers to commit entirely to natural dyes. Regardless, we plan to experiment further with natural dyes to find ways to incorporate them into future production.

4. Materials

The choice of material in our clothing plays a large role in not only the durability, comfort, and functionality of the garment, but also in the health of both the user and our ecosystem[6]. The prevalence of toxic and wasteful materials such as polyester in today's clothing highlights a key issue in today's environment—Brands are more interested in making cheap, mass-produced garments that can be thrown away and replaced than creating garments from high quality materials that are built to last. We reject this wasteful attitude and aim to produce clothing with the highest quality and lowest impact materials we can find.

Found Surface uses only organic and deadstock material from sources we trust. When we purchase raw materials, we prioritize [GOTS-certified](#) organic and [OEKO-TEX Standard 100](#) certified materials that have been proven to be harmless to human health. We do not use polyester or plastic, as they have been proven to be harmful both to humans and the ecosystem. We check in with our suppliers often to ensure that they are following our standards.

Our Materials

- **Organic Cotton** — Our cotton is grown and processed in Lubbock County, TX, using seeds that have not been genetically modified or treated with chemicals. It is not treated with synthetic pesticides, which have been shown to be harmful to cotton growers, and natural growing methods are used to ensure that the soil retains its nutrients[7]. The process of growing organic cotton also has a lower environmental impact compared to conventional cotton, and the end product is a higher quality, longer lasting fabric.
- **Deadstock** — Deadstock fabric is fabric that is left over from the production run of a product and is often left sitting in warehouses or factories. We buy and use this existing fabric instead of producing new materials, which prevents the fabric from going to waste and reduces the environmental impact of our clothing.

Natural Fibers

Other natural fibers such as wool, linen, and hemp have shown tremendous promise over the past few years. While these materials have been around for generations, they are underutilized in today's garment manufacturing industry, despite being a more sustainable and lower-impact choice[8]. This underutilization is due to a distinct

lack of processing capabilities, both domestically and abroad. For example, a vast majority of the 460,000 pounds of wool produced annually in Ohio goes to waste because there is not enough machinery available in the state to process it[9]. Bast fibers, derived from plants such as flax and hemp, have extremely limited processing infrastructure in the United States, effectively making it impossible for consumers to purchase American-grown linen products.

The lack of natural fiber processing capacity makes it hard for brands to incorporate these promising fibers into their clothing.

As stated above, Found Surface will continue to use only natural or deadstock fabrics in our clothing. We are also working with local producers in the Rust Belt to investigate the feasibility of using wool and other natural fibers in future clothing releases.

5. Production Transparency and Worker Ethics

Only about 53% of fashion brands included in the Fashion Transparency Index publish information about their suppliers' policies and commitments to workers' rights[10]. This lack of reporting is due to the fact that many brands are unable or unwilling to publish these policies. Especially with overseas production, working standards are far lower than domestic production: The Clean Clothes Campaign found that out of a sampling of 20 major garment producers, none were paying garment workers a living wage[11]. Found Surface is committed to maintaining transparency and ensuring that all supply chain partners treat their workers ethically. Our domestic supply chain makes it easier to meet these goals.

Found Surface routinely checks in with its supply chain partners to ensure that staff members are paid a fair wage at each step of the production process. Our most recent trip to our partners' facilities was in 2023.

Staff at our sewing facilities are paid hourly as opposed to being paid per piece, which is an illegal industry practice that promotes rushing orders, increases worker fatigue, and reduces the share of profits passed down to sewers[12]. Staff members in all our locations either work in air conditioned facilities or are given days off when working temperatures are too hot.

Our proximity to our partners makes it easy to check in and make sure that workers are being treated fairly and are working in safe environments.

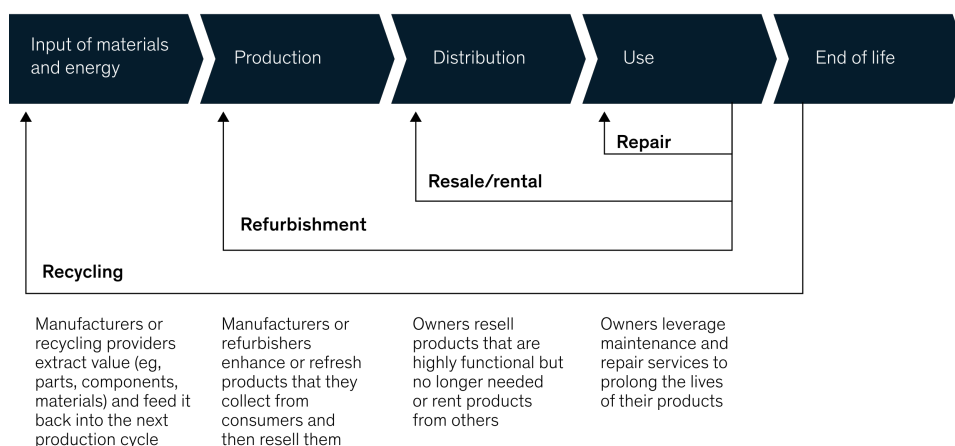
Information about all current Found Surface supply chain partners is publicly available on our website. We plan to continually improve our transparency by learning more about how issues of ethical worker treatment are handled by our partners, ensuring that all staff members at all production facilities are paid a reasonable wage, and highlighting how domestic workers' rights and ethical working conditions compare to overseas.

6. Cradle-to-grave Mentality

The average American throws away 81.5 pounds of clothing annually, and wears garments 7-10 times before discarding them[13, 14]. While this may seem like a lot, it is a direct result of the “cradle to grave” life cycle of modern clothing: Raw material is extracted from the earth, turned into a garment, and used by the consumer until it is thrown away. This cycle encourages brands to make cheap, low-quality products that wear out quicker and require the consumer to buy more clothing. Producing new clothing at such a high rate consumes massive amounts of energy and raw material while also creating a system that disconnects consumers from the impacts of their consumption habits.

The solution to this problem is a circular system of consumption, where a piece of clothing is not sent to a landfill after it is used, and instead put back into the cycle. The implementation of a circular system can take many forms, as outlined by research conducted by McKinsey and Co.[15]

Four loops can keep products and materials in the system for as long as possible in a circular economy.



McKinsey
& Company

A circular economy encourages the production of high quality goods that last longer

before they ultimately deteriorate past the point of repair. This can replace the prevailing consumer attitude of overconsumption with one that places value on quality goods. Many strategies work to close the cycle of production, as detailed below:

Clothing Takeback and Repair Programs

These programs require additional capital and manpower beyond the amount needed for existing production lines. Not only does a brand need to allocate additional capital and production capacity to create the infrastructure to handle a repair program, but it also requires demand for such a program from the consumer. Small clothing brands can typically neither allocate capital towards building an effective repair program nor have enough demand to warrant such a program. Found Surface learned this from experience: We briefly implemented a repair program for Season 1 and found that we did not have the time to repair clothes in-house, and the cost of outsourcing repair would be prohibitive to the customer. The costs and barriers associated with creating a refurbishment program are very similar, which makes such a program difficult to implement for most brands.

If your Found Surface product is damaged, we recommend you take it to a local tailor or alteration specialist for any fixes. This is not only the most environmentally friendly option because the product does not have to be shipped back to us for repair, but it also allows you to support a local garment worker.

Clothing Rental Programs

Clothing rental programs are another possibility for brands that want to reduce the amount of new clothing being produced. This method reduces overconsumption by allowing individuals to wear a piece of clothing a few times before returning it to the rental company for reuse by another individual. This allows clothing companies to produce less clothing while still meeting the demand for new wardrobe options.

Research suggests that the impact of clothing rental compares well to the current system of overconsumption, but it depends greatly on the transportation emissions related to shipping rental garments to and from consumers. Such a system requires careful implementation in order to not offset the benefits[16].

Clothing Recycling

True post-consumer clothing recycling is non-existent – For example, most cotton recycling occurs during the pre-consumer stage, where garment scraps are recycled into a cotton-polyester blend that can no longer be recycled afterwards. Furthermore, there are no domestic post-consumer garment recycling efforts that produce garments of comparable quality to their original inception without mixing recycled materials with virgin ones.

The clothing recycling industry is rapidly expanding, and we are keeping an eye on promising new technologies that can close the loop and turn post-consumer materials directly into new ones.

7. Waste

Each year, 13 million tons of pre-consumer textiles and textile waste are sent to the landfill—of which major amounts are garments that have not been worn a single time[17]. Fashion brands are throwing away about 12% of all fabric that they produce before the consumer even sees a product[18]. To combat this and other high-waste practices, a number of thoughtful approaches exist:

Scrap Waste

- *Cutting optimization software:* Scrap fabric is produced when there is excess unusable fabric as a byproduct of the pattern cutting process. More scrap fabric is produced when the pattern cutting process is done manually without the assistance of cutting optimization programs and laser pattern cutters. Found Surface's Los Angeles production partner uses both of these methods to reduce cutting waste, and our Cleveland partner, whom we use for sample cutting and sewing, uses optimization software and manual pattern cutting.
- *Creative problem solving:* Cutting optimization software only offers so much waste reduction, which is where brands can employ creative solutions to divert their scraps from the landfill. For example, thoughtfully designed patterns can also drastically reduce, and even eliminate, scrap waste. Fabric scraps can also be sewn together into new garments and accessories. Natural, organic textiles with non-toxic materials and dyes can also be composted, which diverts waste from the landfill and returns nutrients to the earth.
- *Our efforts:* Found Surface currently saves its fabric scraps for use in the

research and development of new patterns and styles. We also continually collect data on scrap waste in order to monitor our progress towards reducing our footprint. For future collections, our design team is prioritizing pre-consumer waste reduction to divert waste from the landfill. Although these efforts are still in progress, we plan to explore how fabric scraps can be turned into new garments; any unused scraps will be saved, recycled or composted.

Overstock

Another source of waste in the fashion industry is the overproduction of garments, which leaves brands with standing inventory that often ends up in landfills. Found Surface pledges to never throw away any overstock garments, and is currently exploring alternate production methods that eliminate the need for standing inventory in future collections.

Conclusion

The state of American garment manufacturing faces multifaceted challenges, ranging from transparency hurdles to infrastructural deficits, especially in the backdrop of historical declines in domestic production. Found Surface stands at the forefront of tackling these complexities, advocating for enhanced clarity throughout the supply chain while championing sustainable methodologies in every facet. Our commitment to utilizing organic materials, prioritizing workers' rights, and exploring innovative solutions like natural dyes showcases our dedication to curating a sustainable, ethical, and domestic manufacturing model. The overarching vision is not just about the eco-conscious creation of garments but also fostering a shift in the consumer mindset from a disposable approach to a circular, long-lasting one. As we push forward, our journey is not only about producing quality apparel but is a testament to the potential resurgence of responsible, domestic garment manufacturing. Found Surface's endeavors, though ambitious, reflect a broader aspiration: to reshape the garment industry's standards, making sustainability, transparency, and equity not just aspirations but foundational principles.

We encourage you, the reader, to reach out to us directly with any questions, comments, or concerns related to this document. Through your help, we can better reach our ultimate goal of transparent, circular, and regional garment production.

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