



The fashion industry is a global economic engine, valuing more than **2.5 trillion USD**, employing over **75 million people** worldwide, and growing. Consumers bought **60 percent more garments** in 2014 than they did in 2000.

-Geneva Environment Network 2021

Impact

- The industry now accounts for **10 percent of global carbon emissions**, equivalent to all international flights and maritimes shipping combined (UN News 2019)
- According to the United Nations Conference of Trade and Development, 93 billion cubic litres of water is used in the fashion industry annually, enough to provide for 5 million people, and equalling **20% of global wastewater**.
- **Half a million tons of plastic microfibres** are released into the ocean every year through laundry alone, as water treatment facilities fail to capture the small particles (UN Environment Program 2021)
- **Polyester became the world's most dominant fabric** in 2007 and production is set to triple annually by 2025 (UN Environment Program 2021).
- Currently 60 percent of garment material is made from plastics due to its performance and affordability, however people are **buying more garments but keeping them for less time**, resulting in a throwaway culture and increased post-consumer waste
- The equivalent of one garbage truck of textiles is being **landfilled or incinerated every second** (UN Environment Program 2021)

Challenges & Opportunities

Raw Fibers:

- Fibre crops compete with local human / ecological needs as they can often rely heavily on water, fertilizers and exploit workers. Fabric can be difficult to trace, making it hard to source ethical products.
- Focus should be on sustainably source regenerative raw materials that are low resource-dependant, support local communities and employ safe working conditions. By designing natural and synthetic fibres that are completely recyclable we can feed product back into the fibre industry or another ecological or technological loop.

Current Technologies:

- Regenerative agriculture, Low maintenance natural crops such as hemp and bamboo, Hybrid fibres such as Modal and Pinatex, Recycled synthetics such as ECONYL, reclaimed natural and synthetic fibres, and water saving production techniques (TBD)

Challenges & Opportunities

Production:

- Clothing production is traditionally a linear process, with little consideration of waste and offcuts created in manufacturing. Some garments can filter through many actors during the manufacturing process making sustainability audits more difficult. Much of the production takes place in unregulated markets, affecting labourers that are being overworked and underpaid. Waste and offcuts end up in unregulated waste systems that can have severe environmental impacts.
- Opportunities exist in efficient cutting technology, circular interventions that filter cuttings and loose fibres back into the system, implementation of health and safety regulations, and fair trade policies to improve working conditions. Clothing designers need to align with the manufacturing process and the end of life process

Current Technologies:

- Ultrasound and laser cutting, products made from offcuts, Fair trade frameworks, Big retail accountability and connection to manufacturing sites,

Challenges & Opportunities

Supply Chain:

- As previously stated, fibre, fabric and garments can change hands a number of times during production, disconnecting small actors from big retail business and creating a gap in accountability. Supply chains are considered intellectual property and information is kept confidential. Accountability then often falls to the consumer that can fall victim to greenwashing or lack enough information to make an educated purchase.
- We should strive for radical transparency in the supply chain, data gathering and analysis, open source data access for manufactures and consumers, informative labeling, short supply chains, partnerships between manufactures and retailers.

Current Technologies:

- Third party data sources such as the Open Apparel Registry, IoT tracking devices such as Digital Matter, Safe data storage using Web3 services like Ontology, and Smart labels.

Challenges & Opportunities

Fast Fashion:

- We are buying more and using them for less time. There is less focus on quality, sustainable products and dependence on synthetic fibres that release microfibres into the ecosystem. Repairs are costly and often compete with the price of buying new.
- REDUCE is the most effective choice in limiting CO2 emissions in the fashion industry. Increasing the emotional durability of clothing means consumers will use a garment for a longer period of time and increase good maintenance practices.

Current Technologies:

- Repairs, Thrifting and consignment, Upcycling fabrics, Microfibre capturing such as Cora Ball, Guppyfriend and Lint LUV-R, in-house retail recycling programs such as H&M sustainability initiatives.

Challenges & Opportunities

Greenwashing:

- Many companies offer merger sustainable interventions in their production in order to market to the conscious shopper. Some circular initiatives such as clothing rentals can produce more carbon emissions over time as items change hands due to transportation emissions, cleaning and packaging.
- The ideal state is full transparency in sustainability claims, regulation in marketing and credited sustainability frameworks for business to follow.

Current Technologies:

- Cradle to Cradle, Global Organic Textile Standards, Fair Trade, etc.

Challenges & Opportunities

Governance:

- Legislation is difficult due to the international distribution of actors in garment production. Accountability is often left to the consumer who might not have the necessary information to make an educated purchase or might be affected by greenwashing.
- Collaboration is required at all levels of the fashion industry. Transparency and governance should be established by private business to create effective sustainable solutions.

Current Technologies:

- TBD

The Circular Economy

More than **USD 500 billion of value** is lost each year due to clothing underutilization and lack of recycling. Circular economy should complement ongoing efforts to make the linear textile system more sustainable.

- [Ellen MacArthur Foundation 2017.](#)

The Circular Economy

- **Phase out substances of concern and eliminating microfibre release**
 - Fibre Innovation
- **Increasing Clothing Utilization**
 - Physical and Emotional Durability
- **Radically improve recycling**
 - Circular Technology
- **Effective use of resources and renewable inputs**
 - Reduce water, natural fibres and dyes, fair labour, regenerative agriculture

The Circular Economy

Proceed with Caution...

Does the recycling of material create less negative environmental impact than using virgin materials?

Rebound Effect means that the processing of recycled fibres generates higher CO2 emissions than using virgin materials. This is highly dependent on type of fibre and manufacturing process, but an important consideration nonetheless.