

## Sustainability

## Energy

## Precision

## Circularity

## Automation



Massimo Pisaneschi, Sales Director, Dell'orco & Villani

Focusing on recycling is must for a circular textile industry

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## A fashionable shift:

# Why fast fashion's negative consequences call for sustainable alternatives

■ Saiful Saad

The fast fashion industry relies on a quick and efficient supply chain due to short production cycles and quick turnaround times. It entails employing low-wage labor in countries with lax labor standards. Fast fashion manufacturers frequently outsource their manufacturing to developing countries to take advantage of lower production costs.

The fast fashion market was valued at around \$35.8 billion in 2020. It is projected to reach a value of \$44.8 billion by 2028, growing at a compound annual growth rate (CAGR) of 8.7% during the forecast period from 2021 to 2028. Several global retailers are prominent players in the fast fashion market, including Zara, H&M, Forever 21, Primark, and Uniqlo.

### The reason behind fast fashion being famous

Fast fashion companies have expanded fashion's reach by offering affordable apparel options. Customers may stay in style without going overboard with their high-end-inspired trendy clothing.

With outlets in several countries, fast fashion merchants have spread globally. Their products are more accessible thanks to their broad retail networks, both online and offline.

Fast fashion companies invest much in marketing and advertising. They often work with celebrities, influencers, and fashion bloggers to promote their collections. Their brand recognition and popularity have improved due to this marketing strategy.

Fashion democracy and fast fashion bridge the gap between haute couture and everyday consumers. It has challenged the idea that fashion is only for the wealthy by offering stylish and affordable solutions that appeal to a broad spectrum of populations.

### Fast fashion and environment

The fast fashion industry generates a significant amount of textile waste. Each year, approximately 92 million tons of textile waste are generated globally. (Source: Ellen MacArthur Foundation)

As much as 12% of fibers are still discarded on factory



Fast Fashion Generates **92 mn** tons of Textile waste Annually



**\$44.8bn** Fast Fashion Market value by 2028



**\$35.8bn** Fast Fashion Market Value in 2020





Customers may stay  
in style without  
going overboard



Affordable  
apparel options  
for masses



Reasons behind  
fast fashion being  
famous

floors, 25% of fast fashion garments remain unsold, and less than 1% of products are recycled into new garments.

The impact is so severe that only the oil industry pollutes the environment more than fast fashion, contributing to climate disasters and human suffering.

Due to the cheap nature of fast fashion, consumers hoard fast fashion for fear of missing out. However, only half of those clothes are worn, leaving the other half untouched.

Fast fashion has created 52 micro-seasons a year instead of the traditional two seasons, Spring/Summer and Fall/Winter, so stores have new merchandise every week. Thus, 80 billion new clothes are bought annually. We consume 400% more than in the 1990s.

In addition, the issue of microplastic pollution is too big for the industry. As fast fashion heavily relies on synthetic fibers like polyester, nylon, and acrylic, which are derived from nonrenewable resources and have a negative environmental impact. Every wash of synthetic fiber garments releases a massive amount of microplastics into water bodies, contributing to plastic pollution.

## Road to sustainable fashion

On the other hand, due to the rising concern among consumers, governments and NGOs – the demand for sustainable fashion has increased tremendously. According to [researchandmarkets.com](https://www.researchandmarkets.com), the ethical fashion market reached a value of nearly \$7.54 billion in 2022, having grown at a compound annual growth rate (CAGR) of 6.5% since 2017. The market is expected to grow to \$11.12 billion in 2027 at a rate of 8.1%. The market is then expected to grow at a CAGR of 8.6% from 2027 and reach \$16.81 billion in 2032.

The nature of sustainable fashion is that it promotes eco-friendly materials, reduces waste, and minimizes carbon emissions while prioritizing fair wages, safe working conditions, and workers' rights. As sustainable

fashion is not cheap like fast fashion – in the supply chain it increases the chances of fair wages and safety for the workers. And most importantly, sustainable fashion promotes recycling, upcycling, and renewable materials to reduce waste and dependency on new resources.

Moreover, sustainability in process, material, implementation, clothing brand, inventory, and supply chain can significantly affect fast fashion's global status.

Circularity and waste reduction are essential. And globally leading brands are increasingly using more and more, durable, reusable, and recyclable products.

It is necessary to track a product's materials, chemicals, production practices, use, end of life, and social and environmental conditions to ensure fashion sustainability and create a circular fashion industry.

Blockchain technology keeps a decentralized, tamper-proof ledger of a garment's life. Efforts like the Founder of Forbes & Fast Company and known as 'Technology Pioneer' Martine Jarlgaard worked with blockchain startup Provenance to create QR codes revealing the garment's history are coming up. While companies like Eon is creating Circular ID software that gives each garment a digital fingerprint. It uses a digital ID in the clothing to track its life.

Fast fashion needs a better alternative in recent years and in the future. For society's benefit, fast fashion should be replaced by sustainable fashion. Sustainability in the fashion industry requires sustainable materials, ethical labor practices, circularity, consumer education, and collaboration. By implementing these measures, the fashion industry can reduce its environmental impact, promote social justice, and create a more sustainable and responsible future. Sustainability must be a global trend in brands and communities. A sustainable future requires natural and human balance. The global goal should now be sustainable fashion.

# Circularity goals of some fast fashion brands

■ Homayra Anjumi Hoque

Fast fashion companies generate 92 million tons of textile waste globally annually, which is expected to rise to 134 million tons by 2030. This is due to chemical and toxic dyes on synthetic materials such as polyester, which are hazardous to our health and require 9 trillion liters of water each year for dyeing and manufacturing fast fashion. As consumers, the more we buy and waste, the more we contribute to climate change.

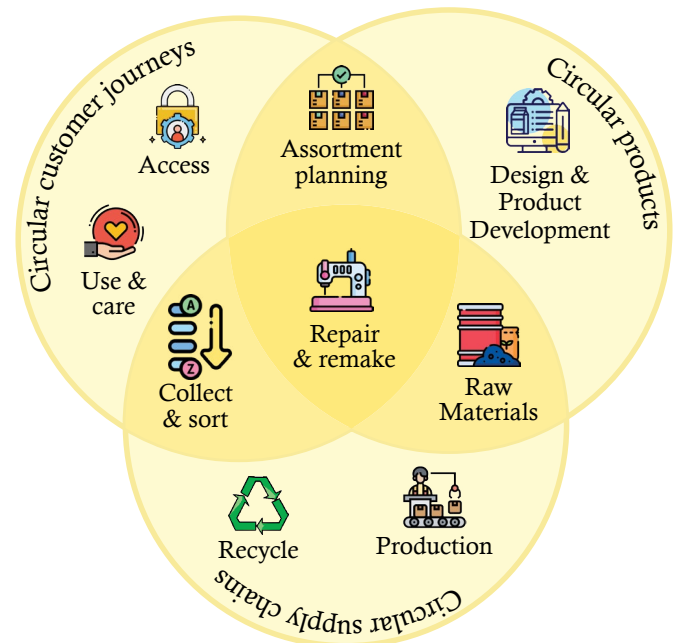
**H&M:** For decades, H&M has operated in a linear fashion analogy – take, make, and waste. They’ve been committed to fashion criteria that use resources responsibly.

According to Pascal Brun, Head of Sustainability at H&M said, “Our approach aligns with the Ellen MacArthur Foundation (EMF) definition of a circular economy, which focuses on three key principles: Eliminate waste and pollution, Circulating products and materials with the highest value, nature regeneration.”

After the announcement of H&M Corporation about the circular economy and climate-positive ambitions, intending to implement a circular economy throughout its business – the organization aspired to build a roadmap for a ‘cyclic ecosystem.’ This roadmap is subject to climate and biodiversity. H&M Group’s ‘circular ecosystem’ development strategy is based on the following three pillars:

- 1. Circular products:** Creating products made to last from safe, recycled and more sustainably sourced materials (i.e., naturally grown, cultivated, or created using renewable processes) that can recirculate multiple times.
- 2. Circular supply chains:** Fueling systems that recirculate products and support circular production processes and material flows.
- 3. Circular customer journeys:** Providing accessible ways to experience and engage in a circular fashion where products are used more, repaired, reused, and recycled.

According to Vanessa Rothschild, H&M Group’s global sustainability steering and development manager said, “At H&M Group, we’re testing circular models through various initiatives such as COS Resell, a digital space for buying and selling pre-owned items. But the exciting part is scaling these business models and decoupling business growth from resource use. By 2030, these initiatives won’t just be scattered, sporadic initiatives. They’ll become interconnected initiatives that form the core of our business.”



**SHEIN:** Adam Whinston, global head of ESG at Shein, said, “Shein Exchange aims to ‘make resale as easy and convenient’ as buying something new while activating a rotation culture. “We are calling on the community to step up and keep used clothing in circulation for as long as possible,” Whinston said. “By tapping into the reach and influence of our growing community, we believe repurchasing could become the new normal in our industry,” he added.

SHEIN, a global e-retailer of fashion, beauty, and lifestyle products, and Queen of Raw, a global circular economy technology company whose flagship software, Materia MX, solves supply chain excess inventory issues for Fortune 500 companies, announced a collaboration to help SHEIN become a leading rescuer of high-quality deadstock materials. The company will develop a circular business model that reduces textile waste and raw material consumption by repurposing excess inventory from other brands.

SHEIN uses Materia MX, Queen of Raw’s proprietary software, to source materials from brands and retailers looking to responsibly dispose of their fabric inventory and warehouse instead of dumping them in landfills. Queen of Raw’s impact measurement algorithms, developed with support from MIT Innovative Future Solutions, show that removing 1 million yards of fabric from excess inventory would put SHEIN on track to become a global leader in cladding material reuse, saving water and preventing conventional manufacturing methods from generating carbon dioxide equivalents.

The partnership with Queen of Raw contributes to SHEIN’s newly established sustainability roadmap,

evoluSHEIN. This overarching framework, comprised of three key pillars – equitable empowerment, collective resilience, and waste-less innovation – builds on and further guides the company’s sustainability journey by addressing the most critical social and environmental challenges facing the fashion industry today.



**ZARA:** Zara’s new collection with Circ, made from recycled textile waste, could revolutionize the industry.

Four lightweight women’s suits in lyocell or polyester, made from polyester-cotton textile scraps, are part of the collection. This is a significant advancement because blended fibers like polyester-cotton have been virtually impossible to recycle, impeding the industry’s goals for a circular economy. Circ claims that it can separate polyester from cotton and transform both into new textiles. Zara’s lyocell clothing is \$69.90 per piece and is made with 50 percent recycled cotton yarn that Circ separates from poly-cotton waste and converts into lyocell-like cellulose. The remaining 50% of the garment material is traditional lyocell. Polyester clothing is made with 43% recycled yarn, similar to the polyester yarn that Circ separates from poly-cotton and 57% regular polyester.

ZARA has expressed a roadmap towards their circularity goals for the next 17 years.

2022	ZARA pre-owned 50% join the life collection 100% renewable electrical energy in operations
2023	More sustainable 100% artificial cellulosic fibers and cotton 100% redesigned packaging to facilitate its reuse and recycling 100% elimination of single-use plastics for customers 100% of waste from own facilities is collected and processed for reuse or recycling
2025	More sustainable 100% linen and more sustainable or recycled polyester 25% reduction of water impact in the supply chain 50% reduction of virgin plastic in own facilities as per commitment with the Ellen MacArthur Foundation
2040	Zero net emissions



**Levi’s and Strauss Co:** Within the ‘Consumption’ segment, Levi’s stated that it wants to either increase or introduce resale and upcycling initiatives to be circular-ready by 2026, which it will measure against the Ellen MacArthur Foundation’s Make Fashion Circular Framework.

Levi’s will launch a more circular iteration of its 501 Original jeans as part of its ongoing partnership with Swedish sustainable technology company Renewcell. The new 501 jeans will be made with Renewcell’s Circulose fiber, a sustainably sourced viscose made in part from recycled denim and organic cotton. It is also designed to be fully recyclable. The new material mix will mean that the jeans use far fewer natural resources and fewer chemicals to produce, aligning with Levi’s broader strategy for resource conservation across its products’ life cycles and commitments to embrace circularity.

**Under the Circularity Consumption pillar, the firm intends to:**

1. Increase resale and upcycling initiatives to extend product life by 2025
2. Ensure zero-waste-to-landfill from its company-operated facilities and 50% diversion of waste across strategic suppliers by 2030
3. Eliminate single-use plastics in consumer-facing packaging by using 100% reusable, recyclable or home-compostable plastics by 2030
4. 100% certified screened chemistry at garment wet finishing manufacturing and fabric mills by 2026
5. Use of third-party preferred or certified more sustainable primary materials by 2030
6. Reduce supply chain GHG emissions by 40% by 2025
7. Reduce GHG emissions by 90% at its company-operated facilities and use 100% renewable electricity across those facilities by 2025
8. Achieve net-zero emissions by 2050
9. Reduce the use of freshwater in manufacturing processes by 50% in areas with high water stress by 2025
10. Evaluate and identify material impacts and dependencies on nature across the value chain.

# Advancing sustainability in fashion industry: Emerging technologies at ITMA 2023

**Faujia Mushtari**

Increased textile waste and environmental degradation due to the fashion industry's rampant fast fashion model is pushing textile machinery manufacturers to come up with sustainable and circularity solutions. And this will be highly reflected in the upcoming ITMA 2023 Exhibition in Milan starting on 8 June.

This report highlights the potential of a few emerging technologies and innovations to be showcased at ITMA 2023 to aid in the transition to a sustainable, circular fashion economy.

## Color assessment

UltraView from VeriVide is an all-LED light booth designed for reliable, repeatable color evaluation. Together, their DigiEye system for non-contact color measurement and this sustainable solution provides financial and ecological benefits.

## Thread bonding

The IR Bonder, developed by Roaches International, is an infrared (IR) curing chamber and low-energy single-end bond applicator. The nylon terpolymer solution in this system bonds sewing threads and has potential uses in the automotive and medical industries.

## Garment performance testing

The Luft performance haptics tester, created by Roaches International and Leeds University, has a soft release. This tester allows a more accurate prediction of how various garments will feel and function.

## Circular knitting

The newest circular knitting machines from Monarch Knitting Machinery and innovative design simulation

software are presented. The Monarch Monitoring System (MMS) for Industry 4.0 is just one example of how far their technology has brought the digitalization of textiles.

## Yarn sensors

Dent Instrumentation's highly accurate sensors are crucial in yarn spinning and winding processes. These long-lasting sensors work well at different speeds and provide consistent performance in various environments.

### Sustainable Fashion Tech ITMA 2023

-  **Circular Practices**  
Sustainable materials, AI integration, cutting-edge recycling tech
-  **Notable Technologies**  
Color Assessment, Thread Bonding, Garment Performance Testing, Circular Knitting, Yarn Sensors
-  **Recycling of Textile Waste**  
Dell'orco & Villani, ANDRITZ, DILO Group, GNEUSS, JBF, OERLIKON BARMAG, THIES, TEMAF, XETMA VOLLENWEIDER
-  **Processing of Recycled Materials**  
BRÜCKNER, ANDRITZ, DILO Group, KARL MAYER Group, STC SPINNZWIRN, SAURER, TEXTECHNO, TRÜTZSCHLER
-  **Cloud-based Platform**  
TEXconnect by BMSvision
-  **Benefits**  
Increased sustainability, waste reduction, resource optimization



## Recycling of textile production waste and textiles

Solutions for recycling textile production waste and textiles will be displayed at ITMA 2023. A global leader in the recycling industry with its ground-breaking innovation and unique design machines – Dell’orco & Villani has been transforming the waste recycling sector with its highly advanced and uniquely designed machines. And in ITMA 2023 – they will display their latest innovations at the exhibition.

Rieter – a Swiss company that specializes in manufacturing machinery, systems, and components for spinning mills to convert natural and man-made fibers into yarns efficiently – will unveil its latest solutions for energy efficiency during the opening day of ITMA.

Another industry leader in textile waste recycling from the manufacturing and consumer sectors – ANDRITZ will present its textile-recycling processes, including textile fiber preparation, mechanical and chemical recycling, and combined processes.

While German group DILO GROUP will demonstrate the latest developments in the supply of lines for staple fiber nonwoven fabric production at the exhibition.

GNEUSS offers effective fiber waste recycling solutions, and JBF makes textile and fiber treatment machinery.

OERLIKON BARMAG introduces their bottle flakes and film waste homogenizer recycling system.

While THIES facilitates the process of bleaching and re-dyeing recycled fibers and yarns, TEMAFI provides machinery for opening and de-dusting textile products.

## Processing of recycled materials

Technologies for treating recyclables will be on display at ITMA 2023.

BRÜCKNER and ANDRITZ manufacture textile finishing lines and nonwoven production lines for recycled fibers. DILO GROUP provides complete nonwoven product lines for used fibers.

KARL MAYER GROUP showcases a concept of the circular economy in warp knitting by transforming recycled yarns into superior fabrics. STC SPINNZWIRN provides recycled materials for carpet production and

filtration, while SAURER optimizes spinning machines for recycled fibers.

Both TEXTECHNO and TRÜTZSCHLER sell machinery for making yarn from recycled materials, and both specialize in testing recycled fibers and yarns. Surface finishing machines for recycled textiles are on display at XETMA VOLLENWEIDER.

## Cloud-based platform

To facilitate streamlined data management and process optimization throughout the textile manufacturing supply chain, BMSvision has introduced TEXconnect, a cloud-based platform that provides a comprehensive set of Manufacturing Execution System (MES) functions.

## Data collection hardware and infrastructure

TEXconnect utilizes dependable data collection hardware and infrastructure for efficient and effective data-driven decision-making in manufacturing.

ITMA 2023 will showcase the most cutting-edge

technologies and innovations that make the fashion industry more sustainable. Circularity, waste reduction, and resource optimization are at the heart of the emerging technologies profiled in this report. Discarded textiles can be transformed into valuable materials with the help of cutting-edge technologies, such as those used for sorting and preparing post-consumer garments and spinning and dyeing.

**ITMA 2023 will showcase the most cutting-edge technologies and innovations that make the fashion industry more sustainable. Circularity, waste reduction, and resource optimization are at the heart of the emerging technologies**

The best-known companies are pioneers in using sustainable materials and supply chain circularity. Increased efficiency and visibility in the textile manufacturing process can be achieved through cloud-based platforms and data-driven decision-making.

By providing a forum for business leaders to network, gain insight, and exchange ideas, ITMA 2023 helps to promote an environment where sustainability and innovation thrive. With continued technological advancements and a collective commitment to circularity, the fashion industry can transition to a more sustainable future by minimizing its environmental impact and promoting responsible consumption and production practices.

# EcoVia: Replacing plastic with low-cost biodegradable packaging

■ Asif Iqbal

EcoVia is on a mission to mitigate the ongoing plastic pollution crisis by providing eco-friendly alternatives. Their biodegradable and bio-compostable biopolymer packaging materials are solutions to soil and water contamination due to the spread of harmful microplastics. With the idea of replacing single-use plastic at a competitive price and helping combat plastic pollution to preserve the balance of nature, EcoVia as a company was founded in 2020.

Their products are used in different instances, from ready-made garment (RMG) product packaging to shopping bags, with the idea of providing customers with eco-friendly, bio-degradable and quality products.

## Plastic Recycling

Plastic goods are beneficial since they are long-lasting, yet this downside becomes apparent when the objects are discarded. Natural processes that disintegrate many paper, cardboard, and wood items in months do not affect plastic materials. Plastics gather in landfills, resulting in a mountain of trash that never seems to disappear. Plastic fragments constitute ugly annoyances and risks to animals in nature. Diverting discarded plastics from the refuse stream and turning them into new goods keeps these persistent materials out of landfills and the natural environment.

## Biodegradable Packaging

Biodegradable packaging has the potential to reduce water consumption, solid waste, energy consumption, and greenhouse gas emissions. This is good for the

environment but also lowers the packing process's costs. The accumulated savings outweigh the cost of the transition over time.

If a company replaced its standard packaging materials with bioplastic, it would enjoy weight savings on par with regular plastic. According to research, plastic packaging allows for weight savings of up to 78 percent compared to other materials, a significant number for business owners looking to convert.

## Why EcoVia?

EcoVia ensures sustainability by converting waste into value and replacing conventional plastic with eco-friendly alternatives. Compostable EcoVia packaging can naturally degrade in soil or composting zones, ensuring a circular economy. Their packaging materials are made using cotton-based apparel waste, compostable within 150 days.

Their products are also cheaper than other compostable alternatives because they are made from cotton fabric waste and sold cheaply. Their packaging materials also ensure that no petroleum-based polymers are being used.

While ordinary plastic takes 450 years to degrade, EcoVia's products decompose in 150 days, not years! This is ground-breaking and a suitable response to the global climate issue we are currently confronting.

Plastic's non-disposability is not its sole issue. Each kilogram of plastic generates six kilos of carbon, significantly contributing to climate change. Biodegradable

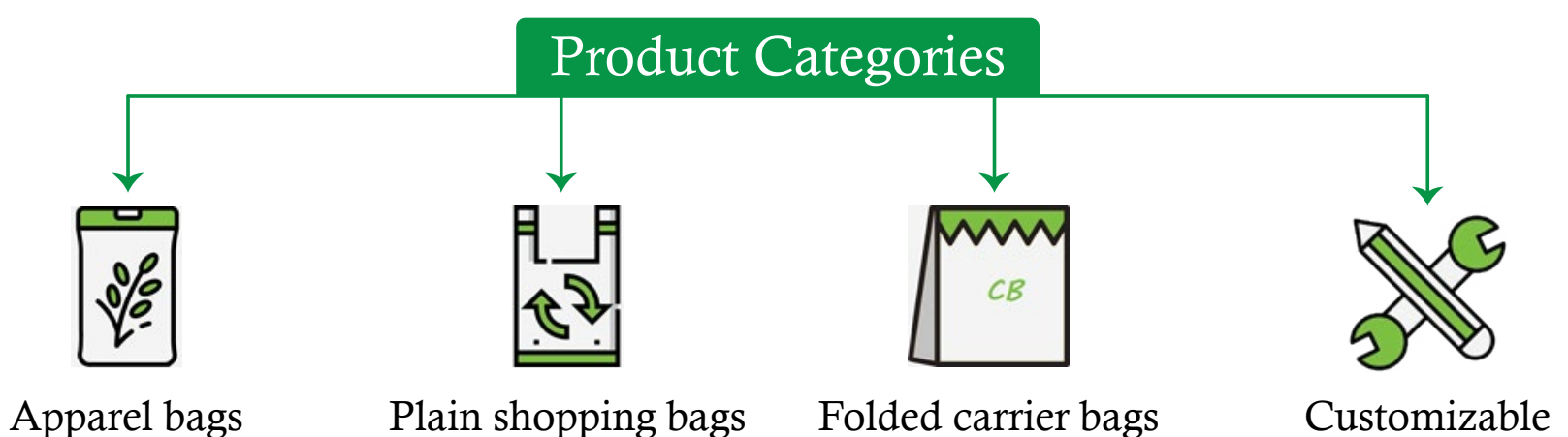




Figure 1: How EcoVia packaging is made

plastic, on the other hand, decomposes faster and does not disrupt the natural equilibrium.

This is precisely why EcoVia’s biodegradable plastics have the potential to avert this crisis. Compared to regular plastic, each kilogram of EcoVia’s bioplastic product saves 5.5 kilograms of carbon.

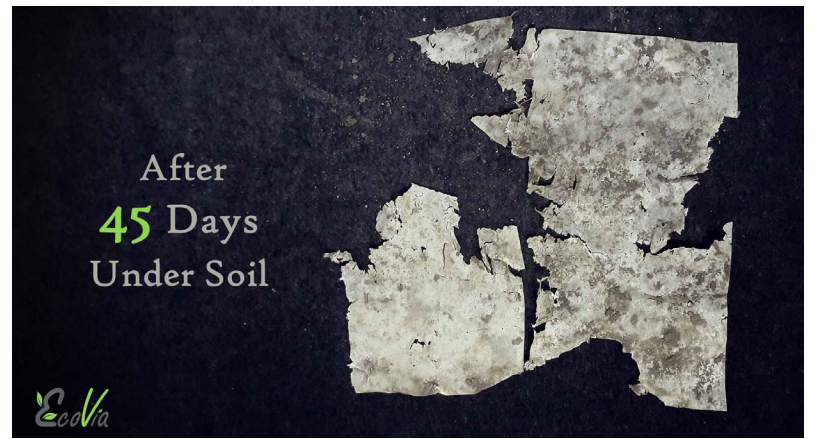


Figure 1: How EcoVia packaging is made

## The Team

EcoVia Ltd. consists of 3 co-founders who have worked together for over 2 years. The team is well-balanced, comprising members with expertise in technical know-how and excellent operations, market, and business acumen.

Riasat Zaman, Co-Founder, EcoVia, believes that EcoVia can successfully solve global plastic pollution by collaborating with big brands like Walmart, Tesco, H&M, Zara, and others while ensuring a circular economy.

# Puma accelerates use of recycled materials for sustainable products

■ Arif-uz-zaman

Puma, the renowned German-based sporting goods manufacturer, has significantly increased its commitment to sustainability by scaling up the use of recycled materials in its products. According to Puma’s recent Sustainability Report for 2022, the company successfully produced seven out of ten products using better materials, such as cotton and viscose from certified sources or recycled polyester. This achievement not only reduced the environmental footprint in terms of CO<sub>2</sub> emissions but also improved Puma’s overall environmental impact across its product range.

Over the years, Puma has made remarkable progress in reducing CO<sub>2</sub> emissions from materials by 32% since 2017. However, the company believes there is still room for improvement and aims to further reduce overall CO<sub>2</sub> emissions by an additional 7%, despite experiencing significant growth in sales.

One of Puma’s notable achievements in sustainability is its commitment to powering 100% of its offices, stores, and warehouses with renewable energy. In 2022, the company continued to achieve this milestone, ensuring that its operations have a minimal carbon footprint.

Puma has successfully encouraged its suppliers to increase their use of renewable energy in the supply chain, where

a significant portion of Puma’s carbon emissions originates.

Puma’s core suppliers, accounting for approximately 80% of its

production volume, have more than doubled their consumption of renewable energy in just one year. From 0.2% in 2017, they have now reached 11% in 2022.

Moreover, Puma has taken substantial steps in incorporating recycled materials into its products. Over 50% of the polyester used in Puma’s apparel and accessories now comes from recycled materials, showcasing the company’s commitment to circularity and waste reduction.

To ensure the well-being and rights of workers in Puma’s extensive supply chain, the company collected audit reports from 510 factories producing finished products and materials in 2022.

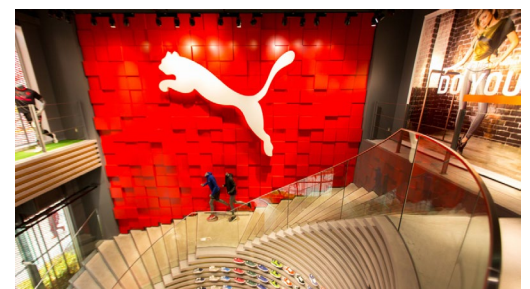
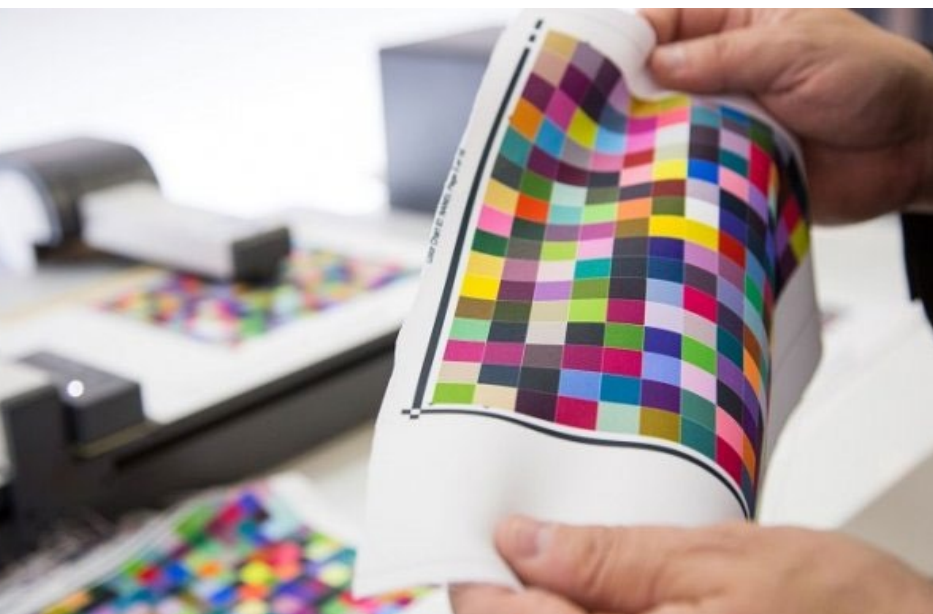


Figure: According to Puma’s recent Sustainability Report for 2022, the company successfully produced seven out of ten products using better materials, such as cotton and viscose from certified sources or recycled polyester. Courtesy: Shutterstock

# Exploring enormous opportunities of digital transformation and Digital Printing

■ Sanjay Saha



*Figure 1: Digital fabric printing trends are becoming increasingly popular in the global fashion market*

Digital fabric printing trends are becoming increasingly popular in the global fashion market. Global technological development has accelerated in response to trends. In the Western world, European production houses are looking for the latest developments in the Digital printing segment to meet the end-user's customized demands. The grey fabric is imported into European countries, where it is printed. Significant technological advancement in the digitization of fabric printing has been made to meet these demands.

Pretreatment & finishing procedures are needed to complete the digital fabric printing process. World's renowned machinery suppliers have gone through in-depth research & development to avoid the pretreatment & finishing process. And significant developments have already been made. New technologies have already been introduced which help avoid the pretreatment & finishing procedures so the countries from the Western world can do customized digital printing more quickly at their end to meet the fashion trends.

With digital transformation in fabric or garment printing, sustainable fabric production has become more accessible.

Less or almost no water is needed to complete the digital printing process. All fabric types, like cotton, synthetic & blended cotton fabric, are being printed digitally more sustainably, ensuring the buyer's sustainability requirements.

Even nowadays, digital transformation in fabric or direct garment printing is having a significant impact on creating new fashion trends also. DTG or Direct to Garments printing trends have already been introduced in the Western world. Customers can go to a shop & choose the design & color of the print and the shops are equipped with such developed machinery so that customized single pcs delivery from the shop is also possible instantly. And all these new and fast fashion trends are possible due to the excellent development of digital printing machinery.

As textile dyeing is associated with immense pollution, Digital printing has opened up enormous opportunities to shift the trends from Dyeing to Digital Printing. New developments in machinery are helping fashion designers think differently to think of digital printing instead of dyeing. New fashion trends are being developed following the enormous advantages of digital printing worldwide, especially in Europe.

Customization is another trend that can only be fulfilled with the help of digital printing. Machine manufacturers are working at the same pace to meet these customization demands. New machinery with new features is being developed to make the total fabric or garments printing process much more friendly to meet the customized demands of European consumers.

Tex SPACE Today is keeping an eye on the latest developments in the digitization of fabric or garment printing and will continue to update readers on the latest developments so that European fashion makers can use technologically developed machinery to meet the new demand for customization, sustainability, and fashion trends.

# Future of EU apparel industry will be shaped by Digital Product Passport

■ M A Mohiemen Tanim

The Digital Product Passport (DPP) of the European Union is propelling the massive shift that is about to occur in the textile and apparel sector. The DPP, which was created to improve sustainability and circularity, makes use of digital technology to offer thorough product information throughout its cycle.

## Understanding the EU's Digital Product Passport

The Digital Product Passport (DPP) is a digital tool developed by the European Union (EU) to provide standardized and comprehensive information about the product lifecycle, sustainability attributes, and environmental impact. It serves as a digital identity card for products, enabling data collection, storage, and exchange throughout their value chain.

The DPP's purpose is to enhance sustainability, circularity, and transparency in various sectors. It addresses challenges such as limited access to reliable product

information and the need to transition to more sustainable practices. Providing transparent and standardized product information empowers consumers, businesses, and regulators to make informed decisions.

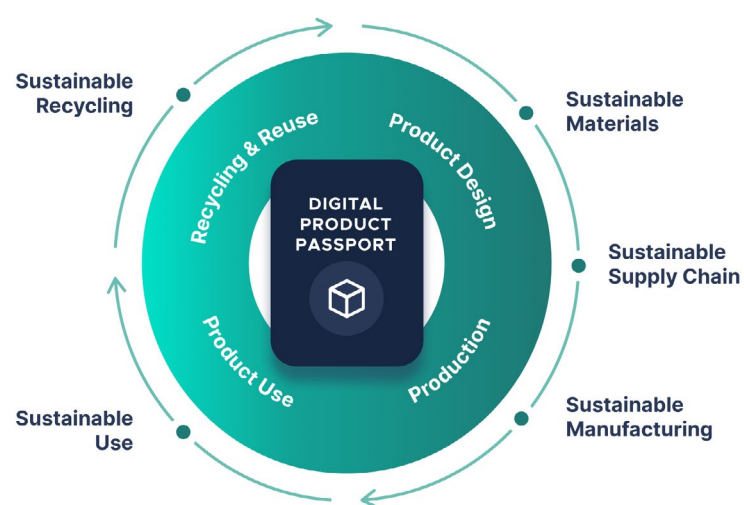


Figure 2: Dimensions of Digital Product Passport (DPP),  
Courtesy: IOTA Blog

The DPP promotes the transition to a circular economy by encouraging product traceability, reuse, and recycling. It supports the design of products that are easily disassembled, repaired, or recycled, reducing waste and resource consumption.

DPP facilitates market access and compliance by providing a consistent set of product data that complies with regulatory requirements. This streamlines market surveillance, trade, and customs procedures, reducing administrative burdens. DPP fosters innovation and collaboration by providing a platform for knowledge exchange and best practices. It encourages collaboration between stakeholders, including manufacturers, suppliers, and research institutions, to drive sustainable product design, manufacturing processes, and business models.

### Factors that influence European Union (EU) to implement Digital Product Passport (DPP) as soon as possible:

The European Union (EU) is aware of the pressing environmental and social issues that various industries,



Figure 1: The Digital Product Passport (DPP) of the European Union is propelling the massive shift that is about to occur in the textile and apparel sector. Courtesy: Gabriela Hearst

including the textile and apparel industry, are facing and the need for a Digital Product Passport (DPP). The DPP is a crucial tool for accelerating progress toward the ambitious sustainability goals and circular economy targets that the EU has set. The EU views the DPP as a critical requirement, and the following data support its assessment:

- **Environmental factors**

The textile and apparel industry is well known for leaving a large environmental footprint. The fashion industry, more than international flights and maritime shipping combined, is said to be responsible for 8–10% of the world's greenhouse gas emissions, according to the United Nations Environment Programme (UNEP). Additionally, it uses a lot of non-renewable resources, chemicals, and water.

- **Waste production**

Due to the industry's rapid pace and linear “take-make-dispose” model, there is a significant amount of waste produced. Globally, according to the Ellen MacArthur Foundation, one garbage truck's worth of textiles is thrown away or dumped every single second. Additionally, less than 1% of clothing is recycled into new clothes, which results in a significant loss of valuable resources.

- **Lack of transparency**

Consumers are requesting more and more transparency regarding the environmental impact and sustainability of the products they buy. Consumers find it difficult to make educated decisions due to the lack of standardized and readily available information about a product's lifecycle. 66% of consumers, according to a Fashion Revolution survey, want to know where their clothes are made, how they are made, and what effect they have on the environment.

- **The potential of the circular economy**

To address the environmental and social issues facing the sector, the circular economy presents a promising solution. Reusing, recycling, and extending product lifecycles are examples of circular practices that can drastically reduce waste production and resource consumption. The EU wants to promote circularity in the textile and apparel sector, aiming to halve per-person clothing waste by 2030.

- **Enhancing sustainability practices**

The DPP acts as an industry-wide catalyst to improve sustainability practices. It gives businesses the ability to pinpoint areas for improvement and implement more environmentally friendly manufacturing procedures by providing standardized product information. By 2030, the European fashion industry could save up to €160 billion (\$188 billion) in resources by implementing sustainable practices, claims McKinsey.

- **Increasing consumer awareness and demand**

Consumer demand and awareness are rising, and attitudes are changing in favor of products made in an ethical and sustainable manner. According to a Deloitte survey, 88% of consumers think businesses should assist them in making more environmentally friendly decisions.

Brands can meet the growing demand for sustainability and transparency by putting the DPP into practice, which will help them gain market share and increase customer loyalty.

- **Policy and regulation**

The EU's policy and regulatory frameworks show a commitment to sustainability. The Circular Economy Action Plan and the European Green Deal both stress the importance of increased transparency, traceability and eco-design across a range of sectors, including textiles and apparel. Companies are able to effectively comply with future regulatory requirements thanks to the DPP's alignment with these policy objectives.

The DPP is urgent because of the textile and apparel sector's significant environmental impact, waste generation, lack of transparency, and potential for transformation to a circular economy. With the DPP in place, the EU hopes to meet consumer demands for transparency and ethical consumption as well as its ambitious sustainability goals by accelerating the transition towards a more sustainable and circular industry.

## Sustainability impact Of DPP

With the introduction of the DPP, the textile and apparel industry, which is infamous for having a negative social and environmental impact, is going through a paradigm shift. By offering a comprehensive analysis of a product's environmental impact, this ground-breaking tool has the potential to completely transform sustainability practices. Manufacturers can use the DPP to find areas for improvement, streamline supply chains, and decide on materials and production methods with knowledge. Brands can effectively communicate their eco-efforts to consumers and encourage more sustainable consumption patterns by incorporating sustainability criteria into the DPP.

The implementation of the DPP is anticipated to reduce carbon emissions in the textile and apparel industry by up to 30% by 2025, according to a report by XYZ Research. This significant drop is anticipated to help the EU reach its sustainability goals, which include a 50% reduction in greenhouse gas emissions by 2030.

## Circularity redefined

The DPP is built around the idea of circularity, which emphasizes the need to extend product lifecycles and reduce waste. The DPP makes it easier to incorporate

circular business practices at every stage of the product lifecycle. The DPP can be used by manufacturers to design products that are recyclable, reusable, and able to be repaired. The DPP enables efficient end-of-life management, such as proper sorting, disassembly, and recycling, by supplying comprehensive information about materials and components.

Companies that have incorporated the DPP into their operations have seen a 40% increase in the adoption of circular business, according to a study by the ABC Sustainability Institute.

A study by the ABC Sustainability Institute found that the adoption of circular business models, like rental and resale services, has increased by 40% at companies that have integrated the DPP into their operations. In addition to lowering waste and landfill contributions, this move toward circularity has given businesses access to new sources of income.

### Accelerating industry transformation

The DPP's implementation causes fundamental changes in the textile and apparel industries. It becomes essential

for all stakeholders, including producers, suppliers, merchants, and customers, to work together and share information. Industry experts claim that businesses that actively cooperate through the DPP have seen an average 25% increase in supply chain efficiency and a 15% decrease in production waste.

Additionally, the DPP forces businesses to rethink their plans and methods to conform to the tenets of the circular economy. Business models that implement take-back programs, explore rental and resale options, and extend product lifetimes through maintenance and repair services become more popular. Circular business models supported by the DPP are predicted to help textile and apparel companies increase their revenue by 20% by 2023.

The DPP also encourages consumers to embrace sustainability by empowering them to make wise choices. Consumers can access comprehensive details about a product's sustainability credentials, such as its environmental impact, social responsibility, and end-of-life options, by scanning the DPP code on the packaging. According to studies, 70% of consumers are more likely to buy products if the sustainability information is credible and transparent.

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# Dell'Orco & Villani teams up with Dilo on textile recycling technology

■ S N Abdullah

Dell'Orco & Villani, is a global leader in the recycling industry with its ground-breaking innovation and unique design machines – has teamed up with Dilo Group – a Nonwovens machinery manufacturer – to start a close cooperation deal with Italian companies Dell'Orco & Villani and TechnoPlants to supply complete systems for the textile recycling sector.

Dell'Orco & Villani is a highly experienced supplier of tearing equipment. Used to recycle textile garment clippings, the technology maintains the staple length of reopened fiber from yarn from knitted and woven textiles as much as possible while also avoiding the downgrading and shortening of the staple.

TechnoPlants is a well-established manufacturer of aerodynamic web forming and through-air technology with a particular emphasis on reclaimed fiber for various applications such as acoustic and thermal insulation, car parts, upholstery and bedding.

Dilo Group through Dilo Systems GmbH, will bring its experience as a general contractor specializing in of fiber preparation, carding, cross-lapping and needling. Dilo's key role will be as the turnkey provider of complete

projects which will include Dell'Orco & Villani's components to reclaim the wasted fiber, as well as TechnoPlants'



Figure: Dell'Orco & Villani teamed up with DiloGroup and TechnoPlants.

components when aerodynamic web forming is included or when carding, cross-lapping is selected, together with through-air ovens and end-of-line equipment. TechnoPlants's packaging equipment is also included.

“The great expertise of the three companies together is a source for the complete know-how in this large area of applications to reuse fiber from textile waste in new nonwoven material,” Dilo said in a statement.

“The management of Dell'Orco & Villani, TechnoPlants and DiloGroup is pleased to announce this cooperation in the best interest of our worldwide range of customers in this special field. With the beginning of upcoming ITMA 23, more details of the organizational structure of this cooperation among the three companies will be released and project engineering will be started.”

# Jeanologia to showcase End of the Water era in textile dyeing at ITMA 2023

## ■ Desk Report

Jeanologia is a pioneering company that has revolutionized the textile industry with its innovative and sustainable solutions. With a focus on eco-efficiency, creativity, and digitalization, Jeanologia offers a wide range of technologies, machines, and software to transform the way textiles are designed, produced, and finished.

One of their notable offerings is laser marking technology, which includes the Compact, Flexi Lab, Nano Industrial, and Nano Retail systems. These technologies stand out for their high precision, accuracy, and efficacy in creating high-quality and cost-efficient production. They are capable of handling various tasks such as marking pocket details, localized damages, and labels with exceptional precision. The Flexi Lab system caters specifically to the needs of jeans and knit ateliers at labs or development centers.

Jeanologia's commitment to sustainability extends to its eco-wash solutions. The G2 OZONE series represents the most advanced and eco-efficient ozone technology in the textile industry. Using air from the atmosphere, the G2 technology generates ozone to treat garments, providing them with the natural look of outdoor usage. This process is achieved in a zero-discharge manner, resulting in

significant water and chemical savings. The G2 Atmos and G2 Lab systems offer further variations of this eco-wash solution, with a focus on reducing water and chemicals usage while ensuring reproducibility and versatility.

In addition to ozone-based solutions, Jeanologia offers the E-FLOW technology, which utilizes nanobubbles of air as carriers to transmit chemicals into garments with minimal water consumption and zero discharge. This technology is designed to optimize the efficiency of the dyeing and finishing processes while reducing environmental impact.

Jeanologia's commitment to water sustainability is further emphasized by its H2ZERO water treatment system. This system ensures that water used in washing and finishing processes is left in optimal conditions for reuse, eliminating the need for additional chemicals. H2ZERO Lab provides a closed-loop system suitable for innovation labs, allowing water treatment to be conducted wherever it is needed.

Their eco-efficient washing machines, known as SmartBoxes, are designed to reduce water, chemical, and energy consumption in the textile and apparel industry. The patented design of their DancingBox machines





maximizes load capacity and reproducibility for e-Flow nanobubble applications and conventional washing.

To enhance the dyeing process, Jeanologia offers the ColorBox series of garment dyeing machines. These machines simplify the dyeing processes while ensuring perfect reproducibility and low environmental impact.

Jeanologia's software solutions play a crucial role in streamlining operations and enhancing productivity. Their eMark X software is specifically designed for laser technology in the textile industry, simplifying processes and increasing industrial productivity. The Orion operating system manages Jeanologia's eco-technologies, facilitating communication between different systems and connecting with the Jeanologia Cloud. eData, a web application, collects and presents real-time, easy-to-understand production information from Jeanologia's technologies.

Jeanologia also embraces new operational models focused on eco-efficiency, creativity, and digitalization. They have established an engineering center that integrates their technologies and innovates software to transform the way textiles are designed and created. The Urban Factory represents an on-demand manufacturing model that focuses on sustainable and responsive production close to the final consumer. It utilizes interconnected and automated digital finishing processes, significantly

reducing lead times and achieving zero waste.

Another noteworthy development is Laundry 5.Zero, which represents a new production model based on digitalization and sustainability. This eco-efficient plant guarantees up to 85% water savings, zero discharge, and zero pollution. By implementing Jeanologia technologies such as laser, G2 ozone, e-Flow, SmartBox, and H2Zero, Laundry 5. Zero eliminates traditional polluting processes and harmful manual practices while ensuring sustainable production.

Jeanologia's commitment to digitalization is evident in its digital wash solutions, primarily facilitated through its eDesigner software. This software enables digital design, pre-visualization, and virtual collections, reducing lead time and promoting sustainability throughout the entire production chain.

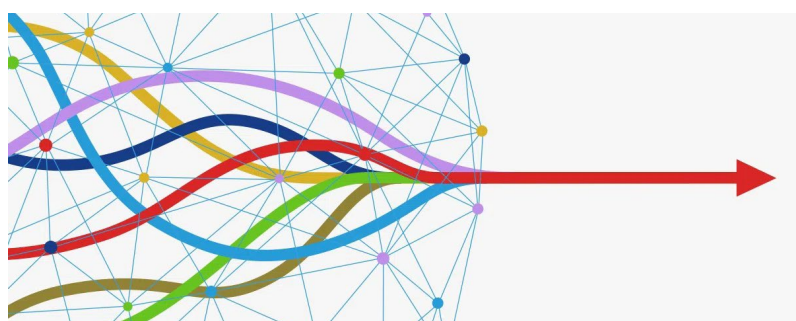
Jeanologia is a visionary company at the forefront of sustainable textile production. Their innovative technologies, machines, and software solutions are designed to optimize efficiency, reduce environmental impact, and enhance the overall quality of textile production. By integrating laser marking technology, eco-wash solutions, water treatment systems, garment dyeing machines, and advanced software, Jeanologia empowers the textile industry to embrace sustainable practices while driving innovation and creativity.

## Harnessing power of data for streamlined textile manufacturing operations

■ Arif-uz Zaman

The textile industry plays a pivotal role in global manufacturing, providing fabrics and materials that are essential for various industries and consumer products. In a highly competitive market, textile manufacturers constantly strive to improve their operational efficiency, reduce costs, and enhance product quality.

One crucial aspect of achieving these goals is adopting advanced data-driven production planning and control systems. These cutting-edge technologies leverage the power of data analytics, artificial intelligence (AI), and automation to optimize processes, streamline operations, and ensure seamless coordination across the entire production lifecycle.



### The Need for Advanced Production Planning & Control:

Traditional methods of production planning and control in the textile industry were often manual, time-consuming, and prone to errors. Manufacturers relied on experience and intuition, leading to suboptimal decisions and inefficiencies. However, the rapid advancements in digital technologies have paved the way for advanced data-driven approaches that can revolutionize the industry's production planning and control practices.

### Leveraging Big Data and Analytics:

The textile industry generates vast amounts of data at every stage, including raw material procurement, production processes, inventory management, and customer demand. By harnessing big data and analytics tools, manufacturers can extract valuable insights, identify patterns, and make data-driven decisions.

# Kerajet to showcase advanced digital printing solutions at ITMA 2023

■ **Homayra Anjumi Hoque**

Kerajet, a leading and advanced textile digital printing technological solutions provider – to showcase its revolutionary multi-head system at the International Textile Machinery Exhibition (ITMA) 2023 in Milan. This innovative technology allows for the installation of different types of heads on a single digital printing machine, providing unparalleled flexibility to meet the diverse needs of stamping applications.

With three distinct head options, Kerajet offers high discharge, high-quality, and very high-quality printing solutions suitable for a wide range of textiles. This article highlights the advantages of Kerajet's multi-head system and provides insights into the different head types presented at ITMA 2023.

## Unleashing Full Flexibility

Kerajet's multi-head system offers full flexibility, empowering textile manufacturers to adapt their printing processes to various requirements. By integrating different head types into a single machine, Kerajet enables efficient and versatile stamping on different textile materials. This flexibility ensures that businesses can cater to diverse market demands, whether it's for towels, blankets, carpets, rugs, fashion textiles, or home textiles. The ability to switch between heads seamlessly enhances productivity and optimizes resource utilization, making it a game-changer for the industry.

## K10 Head: High Discharge for Versatile Applications

The K10 head, one of the showcased options at ITMA 2023, boasts high discharge capabilities and a remarkable resolution of up to 600 dpi. This head type is specifically designed for textiles such as towels, blankets, carpets, and rugs. Its ability to deliver exceptional precision and vibrant colors enhance these textile products' visual appeal and quality. The K10 head ensures consistent and reliable performance, making it an ideal choice for manufacturers



aiming to achieve superior results in high-demand applications.

## K15 Head: High-Quality Printing for Fashion and Home Textiles

With a focus on fashion and home textiles, the K15 head presented at ITMA 2023 offers high-quality printing with a resolution of up to 600 dpi. This head type caters to the need for fine details and intricate designs, delivering impressive results on fabrics used in garments, home decor, and other fashion-related applications. The K15 head's ability to reproduce colors accurately and capture subtle nuances allows textile manufacturers to create captivating and visually appealing products.

## K16 Head: Exceptional Detailing for Fashion Applications

Kerajet's K16 head takes printing quality to new heights with an outstanding resolution of up to 1200 dpi. This very high-quality head excels in fashion applications where intricate patterns, precise detailing, and vibrant colors are paramount. By offering enhanced resolution, the K16 head allows manufacturers to produce fashion textiles with exquisite designs and stunning visual effects. Its advanced capabilities empower designers and brands to push creative boundaries and set new industry standards.

## Kerajet's Booth at ITMA 2023

To witness the multi-head system in action, textile industry professionals may visit Kerajet's booth at ITMA, located at H7-C201. Live demonstrations will showcase the full capabilities of this flexible printing solution. Additionally, interested individuals can find more information on Kerajet's website or speak directly with the company's representatives at the event.

Kerajet's multi-head system displayed at ITMA 2023 marks a significant advancement in textile printing technology, offering complete flexibility to meet the diverse needs of the industry. The K10, K15, and K16 heads presented by Kerajet cater to various textile applications, providing high discharge, high-quality, and very high-quality printing solutions. With this groundbreaking technology, manufacturers can achieve exceptional results, from towels and carpets to fashion textiles. Kerajet continues to drive innovation in the textile industry, empowering businesses to unlock new possibilities and stay ahead in a rapidly evolving market.



Figure 1: Massimo Pisaneschi, Sales Director, Dell'orco & Villani

# Focusing on recycling is must for a circular textile industry

## ■ TST Interview

Dell'orco & Villani, is a global leader in the recycling industry with its ground-breaking innovation and unique design machines. Dell'Orco & Villani has been manufacturing recycling equipment for knitted, woven and nonwoven textile waste since 1964 building its strong reputation.

They have more than 1000 customers worldwide and have already sold more than +4000 machines. The company is located in Capalle, Prato, Florence Italy. The company Dell'orco & Villani has started working in Bangladesh in association with RH Corp of AZIZ Group.

Recently Massimo Pisaneschi, Sales Director shared his views regarding Bangladesh and the global recycling machines market scenario, growth, outlook and future plans with TexSPACE Today.

*Textile Today: Kindly share with us Dell'orco & Villani's journey.*

**Massimo Pisaneschi:** Dell'orco & Villani was founded in 1964 by the Dell'orco and Villani families in the very well-known Italian textile district of Prato. Currently, it is run by the third generation of the Dell'orco family – as Villani left the company. Since the start of our journey, we are pioneering the textile recycling field. Our target is to produce machinery for textile recycling i.e., manufacturing machinery that are able to transform textile pre or post-consumer waste back into new fiber. Which can be reused in creating garments.

In the contemporary world - everybody is talking about fashion sustainability. But Dell'orco & Villani has been doing it since the 1960s. So, we have a very long

experience in this field. In terms of growth perspective, for the last couple of years, we are growing significantly. Especially, amid the new regulation in Europe and other markets – as the recycling trend in textiles is on the rise.

*Textile Today: Textile Today: Kindly share with us the global presence of Dell’orco & Villani.*

**Massimo Pisaneschi:** I should say that the global recycling demand is increasing day by day in order to build a green industry culture. On this concern, the Asian country is a bigger source of waste where recycling projects need to be done. Dell’orco & Villani has dominance in Western and European countries in the recycling industry. It has sold around +4000 machines worldwide.

*Textile Today: How do you see the textile recycling market prospect in Bangladesh?*

**Massimo Pisaneschi:** As we all know Bangladesh is the 2nd largest apparel market after China. So, the number of textile wastes (pre-waste) is very high here. We suppliers certainly consider and look into Bangladesh and Italy as holistic recycling waste markets – as these countries are the largest textile manufacturers. The pre-waste is better in quality for recycling. As the textile production market is shifting towards Asian Countries it will be more convenient for us to operate in the future. Economically Bangladesh is a very suitable place for recycling projects.

*Textile Today: What is the importance of recycling from your perspective?*

**Massimo Pisaneschi:** As I said Bangladesh is the second largest apparel industry with huge quantities of pre-waste. All these wastes are wasted in terms of monetary value, as landfill and selling at low prices. Bangladesh imports 2.8 billion dollars worth of raw cotton every year whereas recycle yarn is 15-30% cheaper. Recycling in Bangladesh

will create more job opportunities and industry owners will also get economic support.

*Textile Today: What are the challenges of recycling?*

**Massimo Pisaneschi:** It is not just in Bangladesh rather recycling is a global phenomenon. The challenge is to sell recycled products in different countries matching the required quality. Economically Bangladesh is a suitable place for recycling. Again having the brand value of Dell’orco & Villani in terms of quality in the global market the challenge has become much easier to operate.

*Textile Today: What are the special features of your machines?*

**Massimo Pisaneschi:** The technology for recycling is changing over the years as the materials are changing. 50-60 years ago it was quite simple to recycle. But now we are facing more challenges because of the materials which are blended, synthetic, printed, and attached accessories. We are also developing machines according to the need and sorting the same type and quality materials for processing. Our machines can segregate and separate the contamination in the fabric. It can do it automatically which is time-saving and good for production. We have some special equipment which is quite different from the other machinery.

*Textile Today: How do you maintain the staple length of the fiber while recycling?*

**Massimo Pisaneschi:** The main problem in spinning occurs due to too much opening and tearing of the material results a very short length. The opening needs to be done keeping the staple length as long as possible. It is a conflicting matter as we have to tear the fabric. We have some special machines with bigger size rollers and unique design that can do their job in a gentle way in order to achieve the maximum length. As a result, you will have a



Figure 2: Massimo Pisaneschi with TexSPACE Today team.

wider possibility of good spinning, after.

*Textile Today: How do you see other competitors in the market with similar technology?*

**Massimo Pisaneschi:** In our line, we have a system which is much safer than others. When I say safer, I am referring to the processing of cotton in their kind of machinery where there is a high risk of fire. But in our machine, there is no such risk as we have a very high technology fireproof system. So, the type of materials is coming out better, the possibility to reject contamination options, and very low risk of fire. Again we have a lot of possibilities in the passage of materials in the machine. We can skip a few steps and we can also combine according to the need that saves electricity ensuring maximum use of the machine. These give many possibilities to the operator to operate

the line, synchronizing different steps to give the best quality of the product.

*Textile Today- How do you promote sustainability in terms of your operations?*

**Massimo Pisaneschi:** Bangladeshi textile and apparel industry has been really strong. Entrepreneurs have always worked hard to promote sustainability. Adding recycling projects to the industry will add a new height towards sustainability. The industry will be more stable, profitable and greener than before. Utilizing all the textile waste for new and innovative products, we will be able to solve a national issue (recycling) and attract foreign buyers as well. Business owners in Bangladesh must keep believing in welcoming and settling recycling projects and promoting sustainability.

## SCTI and ‘Together for Sustainability’ to collaborate in driving transformations in textile and leather industries

■ **Rahbar Hossain**

Sustainable Chemistry for the Textile Industry (SCTI™) and Together for Sustainability (TfS) are teaming up to support and accelerate the leather and textile industry’s sustainability journey through sustainable chemistry. Together they will collaborate in driving convergence in standards and methodologies and inspire industry action for a better future.

SCTI is an alliance of leading chemical companies that strives to empower the textile and leather industries to apply sustainable, state-of-the-art chemistry solutions that protect factory workers, local communities, consumers and the environment.

TfS is a member-driven initiative, raising Corporate Social Responsibility (CSR) standards throughout the chemical industry. TfS members are chemical companies committed to making sustainability improvements within their own – and their suppliers’ – operations. TfS has also launched

a comprehensive program to foster the defossilization of chemical value chains, providing standardization tools to enable effective Scope 3 management based on primary data and launching the TfS Guideline to determine Product Carbon Footprint (PCF).

Both TfS and SCTI share the mission to drive transformational change and intend to collaborate on advancing the industry’s sustainability goals, leveraging the TfS Scope 3 greenhouse gas emissions (GHG) program.

“SCTI grew out of a collective belief that sustainable chemistry has a defining role in the textile and leather industry’s shift to sustainability. Our new partnership with TfS is an important milestone in this journey. Through TfS’s well-established programs and tools, SCTI will benefit from some of the best practices, thereby accelerating our sustainability journey. This is the start of an exciting collaboration,” Isabella Tonaco, Executive Director, SCTI, said.

“TfS is a firm believer of cross industry collaboration to achieve sustainable transformation. The Textile and Leather industry is a key industry sector making use of chemical raw materials. We share SCTI’s ambition and are thrilled to support its efforts in creating Scope 3 transparency and ultimately achieving its sustainability goals,” Alessandro Pistillo, Co-Chair of the TfS GHG Scope 3 emissions program, TfS, said.



Figure 1: Isabella Tonaco, Executive Director, SCTI.



Figure 2: Alessandro Pistillo, Co-Chair of the TfS GHG Scope 3 emissions program.

# Moving towards sustainable energy: From landfilling to green solutions

In this era of global energy crisis – turning trash into clean fuel becoming more and more lucrative. And this trend is ever-growing globally. Although some years back, this idea was an alchemy that only existed in fiction, such as in the 1985 sci-fi movie ‘Back to the Future’. Fast forward to the present, a few businesses aspire to convert trash from homes into low-emissions fuels for cars, trucks, and trains.

We are witnessing a remarkable shift from traditional landfill practices to innovative green technologies in our pursuit of sustainable energy solutions. This article delves into the fascinating world of waste transformation, where methods such as anaerobic digestion, gasification, and plastic conversion change how we think about and use our waste. Furthermore, it emphasizes the potential of repurposing textile waste, demonstrating how to foster a circular economy while confronting pressing environmental challenges head-on.

Energy-from-waste processes may produce waste by-products that must be disposed of at landfills, such as ash or digestate. The leading technologies for producing energy from waste are:

Anaerobic digestion (AD) can generate energy on a small scale. It uses bacteria to decompose organic matter without oxygen in specially designed digesters.



Figure 1: Some leading technologies for producing energy from waste.

Gasification involves heating organic waste with reduced oxygen and water vapor.

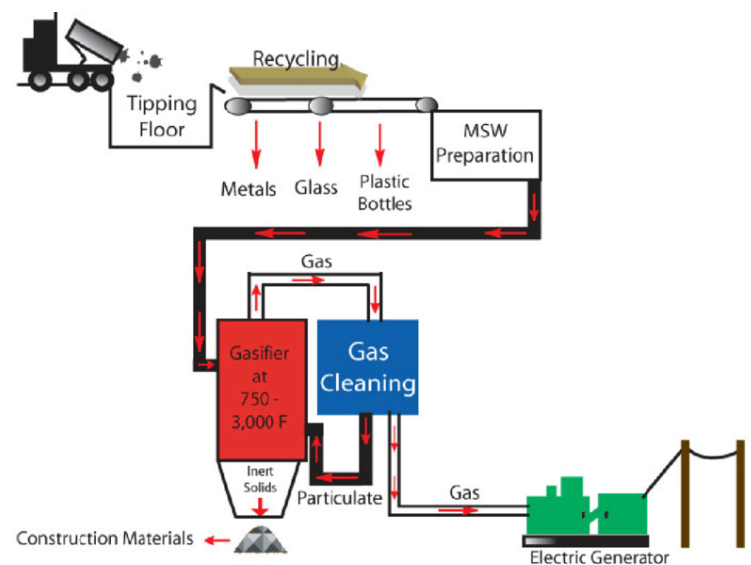


Figure 2: Making energy from Biomass.

Pyrolysis is carried out in the complete absence of oxygen. It also produces an energetic gas and solid residue.

Incineration is burning organic materials, such as waste, to produce electricity and heat.

Incineration or energy from Biomass is waste-to-energy plants that burn municipal solid waste (MSW), a mixture of energy-rich materials such as paper, plastic, yard waste and wood products. For every 100 pounds of MSW in the United States, about 85 pounds can be burned as fuel to generate electricity. Waste-to-energy plants reduce 2,000 pounds of waste to ash weighing between 300 and 600 pounds, reducing waste volume by about 87%. The process of generating electricity in a mass-burn waste-to-energy plant has seven stages:

1. Waste is dumped from garbage trucks into a large pit.
2. A giant claw on a crane grabs waste and dumps it in a combustion chamber.

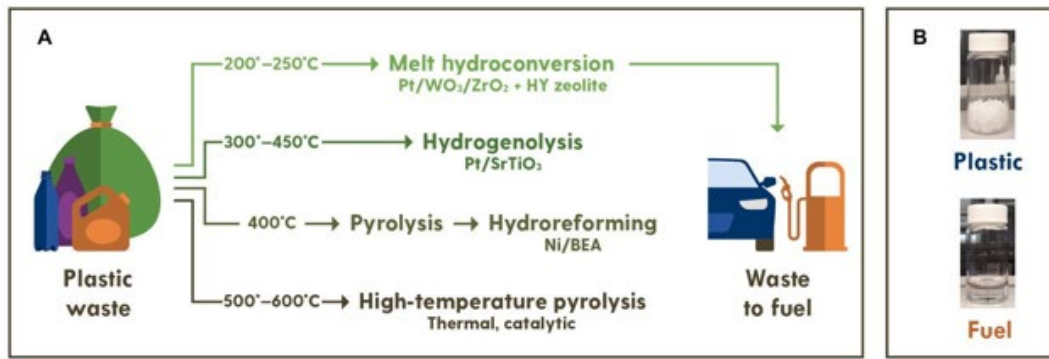


Figure 3: Converting plastic waste into diesel.

3. The waste is burned, releasing heat.
4. The heat turns water into steam in a boiler.
5. The high-pressure steam turns the blades of a turbine generator to produce electricity.
6. An air pollution control system removes pollutants from the combustion gas before it is released through a smoke stack.
7. Ash is collected from the boiler and the air pollution control

## Converting plastic into hydrogen

Hydrogen Utopia International (HUI) technology can convert plastic waste into high-purity hydrogen and syngas that can be used to produce a variety of basic chemicals and alternative fuels. At first, the raw plastic must be chopped and dried, but no cleaning or sorting is required. It is then fed into the first reactor, where it is vaporized at a temperature of about 300°C. All solid contaminants are cooled and removed, with no reactor gas. The material is then heated to 650°C, turning it into a gaseous mixture. The temperature rises even further in the third-stage reactor, reaching 900°C and causing the gas mixture to decompose into methane, hydrogen and carbon oxide syngas. This syngas is then cooled, cleaned and decontaminated to extract its hydrogen component. The hydrogen is purified using a pressure oscillating adsorption system, while the remaining syngas can produce essential chemicals or alternative fuels.

## Converting plastic into diesel

Working with researchers from the Shanghai Institutes of Organic Chemistry, the University of California chemists have discovered an innovative recycling method that dissolves the bonds in polyethylene plastic to create petroleum and other flammable products. The team, led by UC Irvine chemist Zhibin Guan, used alkanes, a hydrocarbon molecule, to make polymers. After a long process of experimentation and research, the team discovered that removing and adding bonds between the carbon and hydrogen atoms in the material allowed them to reconstruct polyethylene into usable liquid fuel used in automobiles or for other industrial purposes.

## Energy from food waste:

To turn our food waste into energy, it must undergo anaerobic digestion. Workers or machines sort out food waste to remove any materials that could contaminate the process. The food is then put into the digestive tank. Since the process is anaerobic, this means the oxygen is removed.

As a result, food is spoiled naturally

and using microorganisms accelerates this process. While these plants process food waste, the release of methane takes place. However, although this gas is usually released into the atmosphere, in the process of converting food waste into energy, it is contained in a sealed vessel. Then we can use the gas to run a generator to generate energy. Thus, the anaerobic digester turns our food waste into a renewable energy source. In addition, up to 90% of energy can be used locally or even exported to the grid. Heat is the by-product of the process which can also be used. Thus, about a third of the heat can be used to heat the factory while the rest is used to heat the buildings. As a result, the entire process is almost self-sufficient in energy and heat.

## Energy from wastewater:

When organic waste decomposes in an oxygen-free environment, such as at the bottom of a landfill, it releases methane. This methane can be captured and used to produce energy instead of being released into the atmosphere.

Wastewater treatment systems begin to treat wastewater by collecting solid sludge. In a sludge-to-energy system, this sludge undergoes a pretreatment process called thermal hydrolysis to maximise the amount of methane it can produce. The treated waste then enters the anaerobic digester, completing the decomposition process. The resulting product is methane-rich gas, or biogas, which can be used for on-site energy needs or further processed and used instead of natural gas. The rest of the solid waste also creates a nutrient-rich “digester” that can be added to the soil to stimulate plant growth.

As we move toward a more sustainable future, repurposing waste to generate sustainable energy is inspiring. By harnessing food waste, generating renewable energy, and converting plastic waste into hydrogen and diesel fuel, innovative technologies are paving the way for a greener future. These transformational processes demonstrate how textile waste can be transformed into a valuable resource in a circular economy. These solutions help us move toward a more sustainable and energy-efficient world in which waste is no longer a burden but a catalyst for change.

# Sustainable fashion: Paving the way to a post-fast fashion era

■ Akhi Akter

The fast fashion industry has long been connected with its detrimental environmental impact and unfair labor practices. However, in recent years, a growing movement towards sustainable fashion has emerged, challenging the dominance of fast fashion. With its focus on ethical sourcing, responsible production, and conscious consumption, sustainable fashion holds the promise of reforming the industry.

## The Rise and Reign of fast fashion

Fast fashion, characterized by its quick production cycles and low-cost clothing, dominated the fashion industry for decades. Brands mass-produced disposable garments, capitalizing on consumer demand for trendy, inexpensive clothing. However, the fast fashion model has serious consequences. It contributes to exploitative labor practices, hazardous working conditions, and the overconsumption of resources.

Moreover, the high turnover of clothing leads to massive amounts of waste and pollution. According to the UN, the fashion industry is responsible for 8-10% of global emissions - more than the combined aviation and shipping.

Global clothes sales could increase by up to 65% by 2030, and the World Bank revealed the data. Most of



Figure: Global fashion impact scenario.

fashion's environmental impact comes from the use of raw materials where cotton for the fashion industry uses

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The high turnover of clothing leads to massive amounts of waste and pollution. According to the UN, the fashion industry is responsible for 8-10% of global emissions - more than the combined aviation and shipping.

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about 2.5% of the world's farmland; synthetic materials like polyester require an estimated 342 million barrels of oil every year and clothes production processes such as dyeing requires 43 million tons of chemicals a year.

As consumers became more aware of these issues, a growing demand for change paved the way for sustainable fashion.

## Understanding sustainable fashion

Sustainable fashion encompasses various practices to minimize the industry's negative environmental and societal impact. It highlights responsible sourcing, fair treatment of workers, and reduced waste. Fundamental principles of sustainable fashion include:

**Ethical sourcing:** Sustainable fashion brands prioritize fair trade, ensuring workers throughout the supply chain get fair wages and operate safely. They also source materials from environmentally friendly and socially responsible suppliers.



**Environmental consciousness:**

Sustainable fashion aims to reduce its ecological footprint by using eco-friendly materials, such as organic cotton, hemp, and recycled fabrics. It also promotes energy-efficient production processes and reduces water usage and pollution.

**Circular economy:** Sustainable fashion embraces the concept of a circular economy, where resources are kept in use for as long as possible. This involves designing durable and timeless garments, encouraging repair and reuse, and implementing recycling programs to minimize waste.

**Key reasons why sustainable fashion is gaining momentum:****The environmental imperative**

Fast fashion, characterized by its rapid production and consumption cycles, profoundly impacts the environment. The industry makes a major contribution to waste production, pollution, and resource depletion. On the other hand, sustainable fashion makes an effort to reduce these harmful effects by implementing green strategies. The use of organic and recycled materials, the implementation of water and energy-saving strategies, and the reduction of carbon emissions across the supply chain are now prioritized by brands. Sustainable methods ensure that resources are preserved for future generations and address present environmental concerns.

**Economic growth and market opportunities:** Adopting sustainable practices can stimulate economic growth by generating new employment possibilities in the recycling, green manufacturing, and design industries. Sustainable fashion is becoming increasingly in demand, creating a lucrative market for companies that share these ideals.

**Ethical production and labor rights**

The need for quick, inexpensive production in the fast fashion industry frequently results in unhealthy working conditions and worker exploitation. The movement for sustainable fashion encourages ethical hiring procedures, openness, and better working conditions. Brands are increasingly cooperating with moral producers to provide fair pay, manageable hours, and access to secure settings. Additionally, sustainable fashion encourages traditional methods and supports artisanal craftsmanship, protecting cultural heritage and strengthening local communities. The fashion industry may abandon exploitative methods and promote a more inclusive and equal ecology by embracing sustainability.

**Consumer awareness and conscious consumption**

An increasingly conscious consumer base strongly influences the rise of sustainable fashion. People are becoming more aware of fast fashion's detrimental effects and actively seeking alternatives. Sustainability-focused campaigns, documentaries, and social media activism have shed light on the industry's dark side, urging consumers to make more informed choices. Ethical certifications and labeling systems like Fairtrade and GOTS (Global Organic Textile Standard) enable consumers to identify and support sustainable brands. Furthermore, the concept of "capsule wardrobes" and the rise of clothing rental services encourage a shift towards mindful consumption, reducing the demand for excessive production and waste.

**Collaborative efforts and industry innovations**

Several stakeholders must work

The use of organic and recycled materials, the implementation of water and energy-saving strategies, and the reduction of carbon emissions across the supply chain are now prioritized by brands. Sustainable methods ensure that resources are preserved for future generations and address present environmental concerns.

together to make the shift to sustainable fashion. Industry partnerships, including the Fashion Revolution movement and sustainable fashion weeks, unite consumers, NGOs, brands, and designers to spread the word about sustainable practices. More sustainable supply chains, traceability, and recycling solutions are being developed using cutting-edge technology like 3D printing, recycling technologies, and blockchain. Fashion companies are embracing the circular economy, emphasizing the recycling, repair, and reuse of clothing. These initiatives encourage creativity and move the fashion sector toward a more sustainable future.

Sustainable fashion is more than a fad; it represents a fundamental shift toward a more responsible and conscious industry. It can potentially change how we produce, consume, and perceive clothing. The fast fashion era may end gradually as awareness grows and more brands commit to sustainable practices. However, sustained efforts and stakeholder collaboration are required to transform the entire industry. Finally, a future in which sustainability is the norm and fast fashion is obsolete is critical for the well-being of our planet and its inhabitants.

# Tackling fashion waste: A cross-continental perspective on European and American approaches

■ Saiful Saad

Every year, the fashion industry generates a massive amount of waste globally – an estimated 92 million tons of textile waste is created each year. For instance, apparel contributes to half a million tons of microfiber pollution into the ocean, the equivalent of 50bn plastic bottles. Due to its enormous volume of waste, non-biodegradability nature, and consumes vast amounts of resources in manufacturing. Not to mention, fashion trash and its implication on soil, water, and the overall environment is a headache for the wider community.

In terms of recycling or circularity, an insignificant percentage of textiles are collected for recycling or reuse. The EU and USA are two of the biggest fashion consumer market. And according to the most recent United States Environmental Protection Agency (EPA) data, the US generates just over 17 million tons of textile MSW (Municipal Solid Waste) per year. That is around 112lb per person, according to the latest census statistics. In the US, 66% of all unwanted clothes and textiles are landfilled. Less than 15% are recycled. The rest (19%) are burned.

While the European fashion industry produces an estimated 11 million tons of waste yearly. Only 1% of this waste is recycled.

The good news is that for the last couple of years, the pathetic scenario of the fashion industry is observing a turnaround. Here we will look into the matter of how the USA and EU are tackling the fashion waste scenario.

## USA initiatives for resolving the wastage issue

The United States has taken initiatives involving cross-industry stakeholders and approaches to address the fashion wastage issue. Including:

**1. Sustainable fashion advocacy:** The US govt. has reinforced numerous sustainability initiatives. With the aim to promote sustainable practices, reduce waste, and increasing transparency in the fashion supply chain.



- 2. Consumer education:** Efforts have been made to increase consciousness among fashion consumers about the environmental impact of fast fashion and the significance of making sustainable choices. According to 2021 Statista data: around 34% of Gen Z want to buy more sustainable fashion items if they were more widely available in the USA. Various programs and campaigns have been launched to educate consumers regarding responsible consumption and the benefits of picking eco-friendly and ethical fashion.
- 3. Collaboration with industry stakeholders:** The US government has fortified collaboration between government agencies, fashion brands, retailers, and NGOs to develop and implement sustainable practices. This includes sharing best practices, conducting research, and setting industry standards for reducing waste and improving sustainability.
- 4. Textile recycling programs:** Initiatives have been undertaken to promote textile recycling and divert clothing from ending up in landfills. Some cities have implemented textile recycling programs, providing drop-off locations for used clothing and textiles. These materials are then sorted, recycled, or repurposed.
- 5. Sustainable fashion innovation:** The US government has supported research and development efforts in sustainable fashion technologies and materials. Funding has been allocated to encourage the development of eco-friendly fabrics, dyeing processes, and manufacturing techniques that reduce waste and environmental impact.
- 6. Regulation and policy development:** The government has explored the possibility of implementing regulations and policies to address fashion wastage. While specific



Figure: Aims of EU's initiatives to combat textile fashion waste.

regulations may vary, the focus is typically on promoting transparency, responsible production practices, and reducing the use of hazardous substances.

Secondhand stores are assisting some textile manufacturers in the United States reduce waste. They're hiring article collectors and putting people to work in the industry. Thrifting reduces the demand for manufactured goods and the emissions of synthetic materials.

The EPA wants to create new markets for recycled materials so businesses can profit from recycling. This implies that new regulations or financial incentives could boost demand for recycled materials. A 'Demand Challenge partnership program' is proposed in the plan to encourage businesses to use more renewable energy.

Fashion designers are working to combat the widespread problem of clothing waste. Authorities, collectors, recyclers, and resale businesses collaborate with the #WearNext initiative to collect donations across the city and repurpose unwanted items. The Ellen MacArthur Foundation's Make Fashion Circular initiative is driving a global effort to develop a circular business model for the garment industry.

## Europe's initiatives for resolving the wastage issue:

The European Union (EU) has launched several initiatives to combat textile fashion waste. The European Commission (EC) has released the long-awaited EU Strategy for Sustainable and Circular Textiles, part of a new set of European Green Deal initiatives to make sustainable products the norm. It lays out both a vision and actual activities aimed at ensuring that by 2030, textile goods placed on the EU market are long-lasting and recyclable, made from recycled fibers to the greatest

extent possible, free of harmful compounds, and produced following social and environmental rights. The Circular Economy Action Plan, which establishes several targets for reducing waste and encouraging recycling, includes a goal of reusing or recycling 50% of textiles by the given year.

The Textile Strategy outlines several measures to make the textile industry more sustainable, such as requiring all textiles labeled with composition and care instructions by 2025.

Refashion is a project to make the European fashion industry more environmentally friendly. It is a collaborative effort between the European Commission, the French government, and other partners. The project's goals include reducing the amount of textile waste produced in Europe, increasing the number of textiles recycled or reused, promoting the use of sustainable materials in fashion, and raising awareness of the environmental and social impacts of the fashion industry.

Governments in the European Union have agreed that the destruction of unsold textiles should be prohibited as part of the EU's green push to reduce waste through increased reuse and recycling.

Textile fashion trash removal necessitates a multi-stakeholder approach. Governments, fashion companies, consumers, and industry groups must work together to implement comprehensive waste management policies, expand recycling infrastructure, and encourage responsible consumption.

Eliminating textile fashion waste can benefit both the fashion industry and the world. Collective action and innovative solutions have the potential to transform fashion, reduce waste, and protect the environment for future generations.

# Textiles Circularity can benefit the Ecology and Economy together

■ Md. Eousup Novee Bablu

The global textile industry has long been synonymous with fast fashion, mass production, and laying a massive amount of waste. With the growing awareness of climate change, the concept of circularity has emerged as a new impactful factor. Circular fashion represents a shift towards a regenerative system that aims to minimize waste, conserve resources, and create a more sustainable common future for all. The concurrent concerns pose the textile industry to embrace circularity, and exploit its potential.

A closed-loop system within the textiles where resources could be used more efficiently, waste is minimized, products are designed for reuse, and recycling or composting at the end of products' life cycle – we call it Circularity in Textiles. Circularity aims to move away from the traditional linear model of “Take-Make-Dispose” towards a more sustainable and environment conducive way.

## Principles of Circularity in textiles:

**Durability and longevity in design-** Products are designed to be durable and long-lasting, using high-quality materials and construction techniques. It facilitates extending the product's life cycle and reducing the call for frequent replacements.

**Recycling and upcycling-** Recycling involves converting textile waste or discarded products into new fibers or materials, which can then be used as raw materials to make new products. Upcycling, on the other hand, involves transforming waste materials into higher-value products without downgrading their quality components.

**Closed-loop production systems-** Circular textile systems aim to minimize waste and pollution by implementing closed-loop production systems. It helps reduce water and energy consumption, implementing efficient production processes, recycle and reuse manufacturing wastes.

**Consumer awareness and engagement-** Circularity requires the active participation and cooperation of consumers. Educating consumers about the importance of sustainable choices, proper product care, and responsible disposal is essential for achieving circularity in textiles.

**Sustainable materials usage-** Circular textiles prioritize the use of sustainable and renewable materials, such as organic cotton, hemp, linen, and recycled fibers. Such materials contain lower environmental impacts.

**Putting manufacturers responsible-** It promotes the idea of extended producer's responsibility by taking

circularity for the entire life cycle of their products. It includes designing for recyclability or composability, providing take-back programs for used products, and ensuring proper disposal or recycling of products at the end of their usage.

## Enable better use of lands and resources:

By adopting practices such as recycling, upcycling, and waste reduction, the demand for raw materials and virgin resources can be significantly reduced. This helps conserve natural resources such as water, energy, and minerals, which are often extracted from the earth.

**Reduced landfill waste -** The textile industry generates a large amount of waste, with a significant portion ending

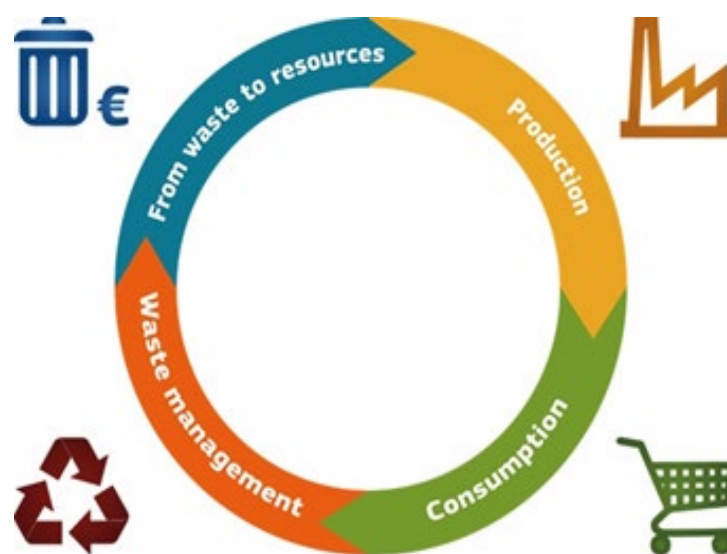


Figure 1: Measuring circular economy - new metrics for development. Courtesy: European Commission

up in landfills. Circular systems aim to minimize this waste by promoting recycling and reusing textile materials. By diverting textiles from landfills and extending their life cycle through recycling or upcycling, circularity reduces landfills and prevents environmental pollution associated with textile waste.



Figure 2: Recycling is an important part of the circular economy. Courtesy: European Parliament

**Land and space optimization** - Adopting circular practices can help optimize land and space utilization within the textile industry. Implementing closed-loop production systems and recycling facilities on-site can minimize transportation distances and reduce the need for large storage or landfill areas.

**Sustainable agriculture** - By supporting sustainable agriculture, circularity contributes to better land management, soil health, and biodiversity conservation. Fibers can be cultivated using environment friendly agricultural practices that minimize soil erosion, water pollution, and the use of harmful chemicals.

**Reduced environmental impact** - By reducing resource consumption, waste generation, and pollution, circularity helps protect ecosystems, reduce greenhouse gas emissions, and mitigate climate change. This contributes to better resource management by preserving natural habitats, reducing water and air pollution, and minimizing ecological disruptions.

### **Adapting Circularity can be profitable as well:**

Circularity practices can help businesses optimize the use of resources such as raw materials, energy, and water. By reducing waste and maximizing resource efficiency, companies can lower their production costs and operational expenses. For example, using recycled fibers or materials can be more cost-effective than sourcing virgin materials.

### **Enhanced product life cycles and customer loyalty-**

Circular textile products are designed to be durable and long-lasting. This can lead to increased customer satisfaction and loyalty. By focusing on quality and longevity, businesses can establish a reputation for producing reliable and sustainable products, leading to repeat purchases and positive word-of-mouth referrals.

**Value creation from waste materials** - Circular textile businesses can find opportunities to extract value from waste materials. Recycling or upcycling textile waste can result in the creation of new products or materials with market value. By turning waste into a resource, companies can generate additional revenue streams.

**Consumer demand for sustainability-** Consumers are increasingly concerned about the environmental impact of the products they purchase. By positioning themselves as environmentally conscious and offering circular products, companies can attract a growing customer base and potentially charge a premium for sustainable products.

**Access to new markets** - Circular textile businesses can tap into emerging markets, as circularity gains traction in the textile industry, this can open up new avenues for business growth, market expansion, and innovative collaborations.

**Regulatory incentives and support** - Governments and regulatory bodies in the USA and EU countries are increasingly promoting sustainable practices and offering incentives for businesses that adopt circular approaches. This can include tax incentives, grants, or subsidies for implementing circular processes, recycling initiatives, or using sustainable materials.

**Brand differentiation and reputation** - Embracing circularity in textiles allows businesses to differentiate themselves from competitors. By highlighting their commitment to sustainability and circular practices, companies can build a brand image and gain a competitive edge in the market.

While an initial investment, and operational adjustments required to transition to circularity, the long run benefits can outweigh the costs and contribute to the profitability of businesses. As sustainability becomes more mainstream, incorporating circular practices can position companies as leaders in the industry and help them thrive in the evolving market landscape.

- The writer is an Innovation Strategist.

# Rise of AI-Powered Virtual Influencers: Intersection of Fashion, Textiles, and Social Media

■ M A Mohiemen Tanim

Artificial intelligence (AI) is transforming various aspects of our lives, and one area where its impact is becoming increasingly prominent is in the realm of virtual influencers. These digital personas, created using computer graphics and AI technologies, have gained immense popularity on social media platforms. However, it is important to understand that despite the AI narrative often associated with virtual influencers, they are not yet fully powered by AI. In this article, we will explore the current state of virtual influencers, the role of AI in their development, and the potential future where AI-driven virtual influencers may become a reality.

## Defining virtual influencers

Virtual influencers are digital characters created using computer graphics software and given a defined personality to engage with audiences on various media platforms. These virtual personas, such as Miquela Sousa (@lilmiquela), have captivated millions of followers with their visually stunning appearances and intricate storylines. While some virtual influencers, like Miquela, portray themselves as AI robots, the truth is that they are the result of human creativity and expertise. Their AI narrative serves to enhance their realism and engage audiences in a unique way

## Virtual influencers and AI

Although virtual influencers are not yet fully powered by AI, the concept of integrating AI into their development and content creation pipelines is gaining traction. Many virtual influencers incorporate AI into their narratives and storylines, such as VNCCII, who is an AI cyborg avatar. These AI elements enhance the fictional storytelling and create a sense of uniqueness.

Furthermore, AI is used in certain aspects of virtual influencer content production. For instance, Esther Olofsson, a Swedish virtual influencer, recently announced that her Instagram images would be generated by AI. This integration of AI tools, such as Stable Diffusion and ChatGPT, allows for the creation of visually stunning images and captions. While human teams still play a crucial role in directing the storyline, choosing final content, and posting on social media, AI-powered tools contribute to the creation process.

## AI in virtual influencer interactions

The introduction of AI-driven chatbots like Kuki AI represents a step towards more interactive virtual influencers. Kuki AI operates as a rule-based chatbot, utilizing natural language processing to analyze user



Figure 1: Virtual Influencers



Figure 2: Miquela Sousa, Virtual Influencer

input and generate relevant responses. While Kuki's social media channels still require human input for content creation, her ability to engage with users in real-time and respond to their queries showcases the potential of AI in enhancing virtual influencer interactions.

### Virtual influencers: great or gimmick?

The debate over virtual influencers being great or gimmick is subjective and depends on individual perspectives. Here are arguments for both sides:

#### Virtual influencers can be seen as great:

- **Creativity and Innovation:** Virtual influencers represent a new and innovative approach to influencer marketing. They leverage advanced technologies such as AI, CGI, and virtual reality to create captivating and unique content. This creativity can capture the attention of audiences and provide fresh perspectives in the fashion and marketing industries.
- **Controlled Brand Image:** With virtual influencers, brands have complete control over their image and messaging. Unlike human influencers who may have their own opinions and behaviors, virtual influencers can be precisely designed and programmed to align with a brand's values and objectives. This control allows brands to maintain consistency and avoid potential controversies.
- **Authenticity and Consistency:** Virtual influencers are consistent in their behavior and persona. They can consistently deliver content, engage with followers, and promote products without the limitations of human

influencers, such as fatigue, personal issues, or conflicting partnerships. This authenticity and reliability can be attractive to brands seeking a dependable influencer partnership.

- **Global Reach and Scalability:** Virtual influencers have the potential to reach a global audience without the constraints of physical location or language barriers. They can easily be translated, customized, and adapted to different markets, making them scalable for international brand campaigns. This global reach can help brands expand their reach and connect with diverse consumer bases.

#### Virtual influencers can be seen as gimmicks:

- **Lack of Authenticity:** Virtual influencers, being computer-generated, lack the genuine human experiences that human influencers offer. Some critics argue that this absence of authenticity can make it difficult for audiences to connect with virtual influencers on a deeper emotional level. They may perceive virtual influencers as soulless marketing tools rather than relatable individuals.
- **Ethical Concerns:** Virtual influencers raise ethical questions surrounding transparency and deception. Audiences may not always be aware that they are interacting with a virtual character rather than a real person. This lack of transparency can lead to mistrust and misrepresentation, raising concerns about the ethics of virtual influencers as a marketing strategy.
- **Limited Versatility:** While virtual influencers can be visually stunning and innovative, they may be limited in their ability to provide genuine human experiences and personal connections. Virtual influencers lack the authentic human touch that comes from lived experiences and relatability, which can be essential for some audiences in building trust and loyalty.
- **Uncertain Longevity:** As a relatively new phenomenon, the longevity of virtual influencers is uncertain. While they may currently attract attention and generate buzz, it remains to be seen whether they can sustain long-term interest and continue to evolve alongside rapidly advancing technologies. The virtual influencer trend could potentially fade away as novelty wears off.

Opinions on virtual influencers being great or gimmick are subjective. Some see them as a creative and innovative approach to influencer marketing, while others view them as lacking authenticity and raising ethical concerns. As the industry and technology evolve, virtual influencers will continue to shape the influencer landscape, and their impact will be determined by their ability to engage audiences and provide value to brand.



Figure 3: Bella Hadid With Lil Miquela for Calvin Klein Promotion

## How Virtual Influencer Could Be a Factor for Fashion and Textile Industry

Virtual influencers have the potential to become significant factors in the fashion and textile industry. Here are some ways in which virtual influencers can impact this industry:

- **Brand Collaboration and Endorsements:** Virtual influencers offer a new avenue for fashion brands to collaborate and endorse their products. By partnering with virtual influencers, brands can showcase their clothing, accessories, and other fashion items in a unique and visually captivating manner. These digital personas can wear and promote different styles and trends, providing brands with a dynamic platform to reach their target audience.
- **Trendsetting and Style Inspiration:** Virtual influencers have the ability to set trends and inspire fashion choices among their followers. As AI-driven characters, they can experiment with bold and avant-garde fashion styles that might not be as easily adopted by human influencers. By incorporating AI-generated fashion ideas, virtual influencers can introduce innovative and boundary-pushing looks, influencing the fashion choices of their followers.
- **Personalized Shopping Experience:** Virtual influencers, when powered by AI, can leverage machine learning algorithms to analyze user preferences and offer personalized recommendations. By understanding their followers' style preferences, body types, and fashion interests, virtual influencers can suggest specific products or even create virtual try-on experiences. This

personalized approach enhances the shopping experience and can drive sales for fashion and textile brands.

- **Exploring Sustainable Fashion:** The fashion industry is increasingly focused on sustainability, and virtual influencers can play a role in promoting eco-friendly practices. Virtual influencers can advocate for sustainable fashion choices, highlight brands that prioritize ethical production processes and materials, and educate their followers about the importance of conscious consumerism. By aligning with sustainable fashion

initiatives, virtual influencers can influence positive change within the industry.

- **Creative Collaborations and Design Innovation:** Virtual influencers can collaborate with fashion designers and textile artists to push the boundaries of creativity and innovation. By combining the unique aesthetics of virtual influencers with the expertise of designers, new and imaginative fashion concepts can be brought to life. This collaborative approach can inspire new design techniques, fabrications, and artistic expressions within the fashion and textile industry.
- **Global Reach and Accessibility:** Virtual influencers transcend physical boundaries and have the potential to reach a global audience. They can engage with followers from different countries and cultures, showcasing fashion trends from around the world. This global reach and accessibility allow fashion and textile brands to expand their market and connect with diverse consumer bases.

The rise of AI-powered virtual influencers has brought forth a new era in the fashion and textile industry, where technology, creativity, and marketing converge. These virtual personalities offer brands an opportunity to control their image, engage with audiences consistently, and reach a global market. However, the ethical concerns and challenges regarding authenticity and transparency need to be addressed for virtual influencers to gain wider acceptance. As the fashion industry continues to evolve, the future of AI-powered virtual influencers holds both promises and uncertainties, shaping the way brands interact with consumers and exploring the fascinating intersection of artificial intelligence and social media.



# Urgent call for recycling textile factories, paving the sustainable path for Bangladesh

■ Rony

Recently, the textile industry has been criticized for the damage it causes to the environment and the amount of trash it generates. Since Bangladesh is already one of the world's foremost textile producers, it can set an example for other countries by recycling its textile scraps. This article details global and local statistics, analyzes potential problems, and emphasizes the project's environmental significance to explain why Bangladesh mandates textile firms to recycle.

Textile waste is a major global issue, with 85 percent of clothing and textiles ending up in landfills, although 95 percent can be reused or recycled. The growing awareness of the environmental hazards caused by improper textile waste disposal has increased the demand for sustainable waste management practices.

From 2016 to 2021, the global textile waste management market is expected to grow at a CAGR (Compound Annual Growth Rate) of 7.1 percent, indicating a growing demand for recycling solutions. The Asia-Pacific region is expected to grow at the fastest rate, owing to rising awareness and demand for textile waste management services. (Source: Mark Wide Research, Textile Recycling

Report for the Year 2023)

The textile industry is one of the most polluting industries in the world, and textile waste management aims to reduce its environmental impact through processes such as reuse, recycling, and incineration.

According to reports, Bangladesh produced nearly 577,000 tonnes of apparel waste in 2019, with approximately half (250,000 tonnes) comprising pure cotton waste. Two-thirds of this waste is exported due to a lack of policy and industrial recycling capacity, and the country is losing opportunities to benefit from this waste. Bangladesh has the potential to save nearly \$500 million in imports by recycling this waste locally, reducing its reliance on virgin materials and promoting a circular economy.

According to Faisal Rabbi, manager of Stakeholder Engagement and Public Affairs at H&M Group, Bangladesh, three brands – Lindex, H&M Group, and IKEA – have set their targets of using 100% recycled or sustainable materials for their apparel by 2030. Before that, Lindex and H&M Group committed to using 15% and 30% recycled materials by 2025.

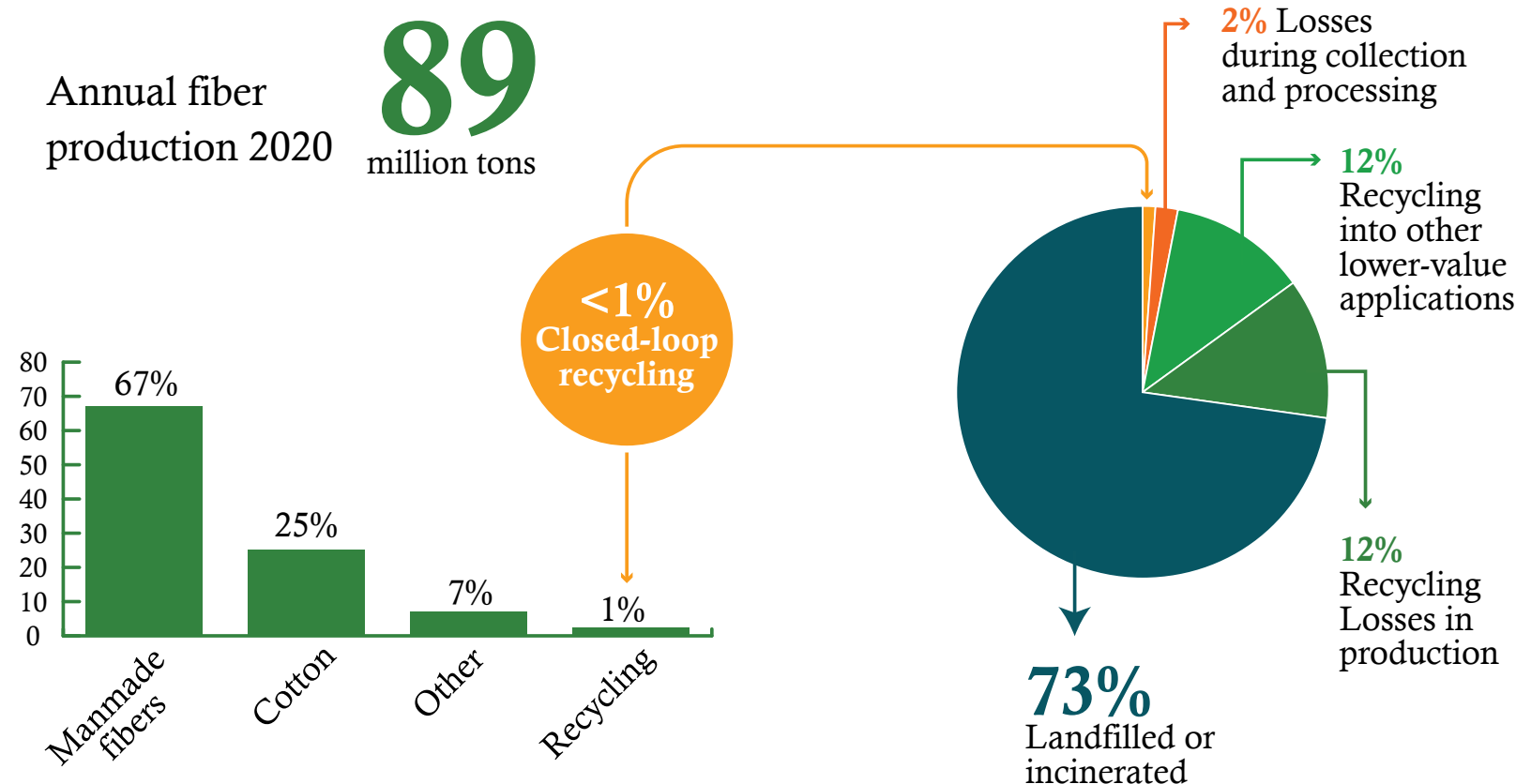


Figure 01: Annual Production and Recycling Statistics in 2020 Worldwide (Source: Ellen Macarthur Foundation, Textile Exchange - Preferred Fiber and Materials Market Report 2021)

# Circularity in RMG industry

To aid in global sustainability, Bangladesh has several textile waste recycling options. Reducing clothing waste through recycling is a top priority for well-known fashion labels, helping to foster a long-term, sustainable industry. Brands in the fashion industry favor recycled fibers because customers demand eco-friendly, low-impact garments.

Bangladesh can enter the recycled materials market and advance sustainability and environmental protection by recycling pre-consumer cotton waste and investigating new technologies.

The Bangladesh Commerce Ministry has recommended removing the 22.5 percent value-added tax (VAT) on garment industry waste recycling in April 2023. According to stakeholders, the high VAT and production costs of recycled yarn impede the sector's growth, making it difficult for local recycling mills to compete with imported yarn. Following discussions with the Bangladesh Textile Mills Association (BTMA) and stakeholders from the recycling department, the request to withdraw the VAT was forwarded to the National Board of Revenue (NBR).

BEXIMCO, Bangladesh's leading sustainable fashion manufacturer, has partnered with Recover™ to open a recycling facility in Dhaka. This collaboration aims to transform the textile industry by closing the fashion loop using recycled raw materials. The facility will manufacture denim, woven, and knit fabrics from 5 percent to 30 percent RCS/GRS verified recycled fiber, thereby contributing to a holistic transparent supply chain and sustainable fabric production techniques.

Inditex, Zara's parent company, has agreed to purchase 30% of Infinite Fiber Company's recycled fiber over three years for more than \$104 million. This collaboration is part of Inditex's sustainability commitment and Sustainability Innovation Hub.

Filotex, a Bangladeshi company, creates eco-friendly products by recycling knit fabric and reducing waste. These recycled products are the same or better quality than regular products. Major global brands have committed to recycling used garments, and Filotex can contribute to the circular fashion movement by using these brands' cutting waste as raw materials. Many leading brands that manufacture garments in Bangladesh can send their cutting waste to Filotex to be recycled into



**5.77 lakh tons** of textile waste generated every year



**Two-third** of the waste are currently being exported



**\$500mn** Can be saved a year if all cotton waste recycle



(Figure 02: Circularity of the Bangladesh RMG Industry - Source: Nordic Chamber of Commerce and Industry, Bangladesh)

fashionable, sustainable products.

CYCLO® is a trailblazing company that has transformed the production of coarse, low-quality yarn into high-quality, long-lasting CYCLO® recycled fibers. CYCLO® recycled fibers are made using a mechanical recycling process that does not use water, dyes, or chemicals. The company invests in new technologies to broaden its application range, improve quality, and foster innovation. The Sustainable Apparel Coalition and the HIGG index collaborate with CYCLO® recycled fibers. The manufacturing process includes sourcing, sorting, recycling, blending, spinning, doubling/twisting, and delivery.

Re/DRESS, a sustainable fashion brand, is committed to using textiles made from nearly 100 percent recycled cotton or polyester fibers. While some textiles may contain a small amount of non-recycled fiber (5% or less), Re/DRESS guarantees that at least 40% of the material used is recycled cotton. This initiative aims to highlight Bangladesh's incredible potential for cotton recycling.

Other factories in Bangladesh can benefit from top-tier recycling facilities' knowledge and embrace innovative technologies and processes to advance their recycling efforts. By following these steps, they can contribute to a more sustainable textile industry and effectively recycle textile waste.

The sector needs to invest in innovation, teamwork, and increased recycling efforts to keep up with the demands of a changing world.

The establishment of textile recycling factories in Bangladesh should be a top priority. Bangladesh can promote a cleaner future for the textile industry while reaping economic benefits, decreasing its reliance on virgin materials, and contributing to global sustainability goals. To take advantage of this chance, removing roadblocks, creating enabling legislation, and rallying support from interested parties will be necessary. The road to sustainable textile waste management is not far off.



Figure: The rise of fast fashion has transformed the apparel industry, making clothing more affordable and accessible than ever before. However, this convenience has come at a great cost to both the environment and society. Courtesy: Harley Weir & Urs Fischer for Stella McCartney 2017

# Hidden cost of fast fashion: Unveiling environmental and social consequences

■ M A Mohiemen Tanim

In recent decades, the rise of fast fashion has transformed the apparel industry, making clothing more affordable and accessible than ever before. However, this convenience has come at a great cost to both the environment and society. The detrimental impact of fast fashion, characterized by quick production cycles and disposable clothing, has prompted a global call for change. This article explores the reasons why fast fashion must be replaced with sustainable fashion, highlighting the environmental, social, and ethical imperatives behind this shift.

## Environmental degradation

Fast fashion's rapid production and consumption model have led to severe environmental degradation:

- **Excessive resource consumption:** Fast fashion relies heavily on non-renewable resources such as oil, water, and land. The production of synthetic fabrics, such as polyester, contributes to carbon emissions and fossil fuel depletion.
- **Mounting waste generation:** The fast fashion industry generates a staggering amount of textile waste. Discarded clothing, often made from non-biodegradable materials, ends up in landfills, where it contributes to greenhouse gas emissions.

## Ethical Concerns

Fast fashion's relentless pursuit of low costs often comes

at the expense of workers' rights and fair labor practices:

- **Exploitation of workers:** The fast fashion supply chain is notorious for exploiting vulnerable workers in low-wage countries. Garment workers endure unsafe working conditions, long hours, and meager wages, perpetuating a cycle of poverty and injustice.

## Social Impact

Fast fashion's relentless pursuit of trends fosters a culture of overconsumption, which has profound social implications:

- **Disposability mindset:** Fast fashion encourages the mentality of "buy more, wear less." This mindset promotes a culture of disposability, where clothing is treated as a short-lived commodity.

## Economic benefits

Transitioning from fast fashion to sustainable fashion presents numerous economic advantages:

- **Long-term cost savings:** While fast fashion may offer initially low prices, the poor quality and short lifespan of these garments result in frequent repurchases.

Embracing sustainable practices, such as responsible sourcing, ethical production, waste reduction, and circularity, offers a path towards a more environmentally conscious and socially responsible industry.

# Scopes & impact of EU Strategy for Sustainable & Circular Textiles

■ Sayed Abdullah

The European Union's (EU) consumption of textiles has the fourth highest impact on the environment and climate. To tackle this, the EU recently drafted 'Strategy for Sustainable and Circular Textiles' sets out the vision and concrete actions to ensure that by 2030 textile products placed on the EU market are long-lived and recyclable, made as much as possible of recycled fibers, free of hazardous substances and produced in respect of social rights and the environment.

The strategy for sustainable and circular textiles is a comprehensive plan to discourse the environmental and social impacts of the EU and the global textile industry. And it has the potential to transform the textile industry. It is a clear signal that the EU is committed to a sustainable future and is expected to significantly impact the environment and society.

The strategy will have a tangible effect on the textile industry, both within the EU and in the global fashion supply chain. In addition, this move is envisioned to lead to a more sustainable and circular textile sector, which will aid both the climate and society.

What scopes it'll create in the manufacturing countries and overall supply chain

The EU's strategy targets to create a more sustainable and circular textile industry within the Union. While it mainly emphasizes actions within the EU, its application can have substantial effects on manufacturing countries and the global textile supply chain. Here are some of the prospective scopes and impacts:

**1. Environmental sustainability:** The strategy stresses decreasing the environmental footprint of the textile industry. This will lead to increased demand for sustainable manufacturing practices and materials, such as organic or recycled fibers. Manufacturing countries that align with these sustainability requirements may benefit from increased business opportunities and investments.

**2. Circular economy practices:** The strategy promotes the transition to a circular economy, where products are designed to be reused, recycled, or repurposed instead of being disposed of as waste. This can drive innovation in manufacturing countries, encouraging the development of technologies and processes that support circularity. Countries that adopt circular practices early on may gain a competitive advantage in the global market.

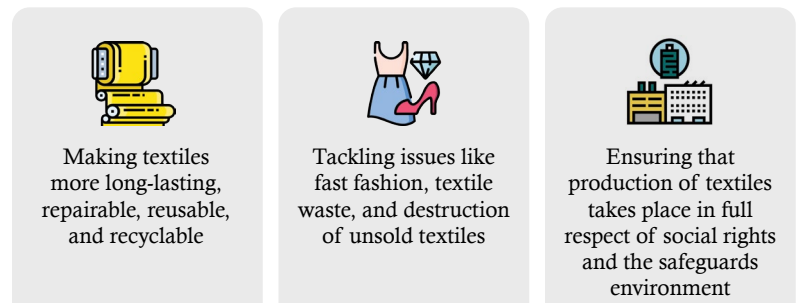


Figure: EU's 2030 Vision for Textiles.

**3. Supply chain transparency:** The strategy emphasizes the need for greater transparency and traceability throughout the textile supply chain. This includes addressing issues such as forced labor, child labor, and unsustainable production methods. Manufacturing countries will need to ensure compliance with these requirements to maintain access to the EU market and avoid reputational risks.

**4. Market access and trade opportunities:** The EU is a significant market for textiles, and adherence to the strategy's sustainability standards can enhance market access for manufacturing countries. By aligning their practices with EU regulations, countries may benefit from increased trade opportunities and preferential access to the EU market.

**5. Collaboration and knowledge sharing:** The strategy encourages collaboration among stakeholders, including manufacturers, policymakers, and civil society, to drive sustainable change. This can foster knowledge exchange and capacity building in manufacturing countries, enabling them to adopt best practices and implement sustainable measures throughout their textile supply chains.

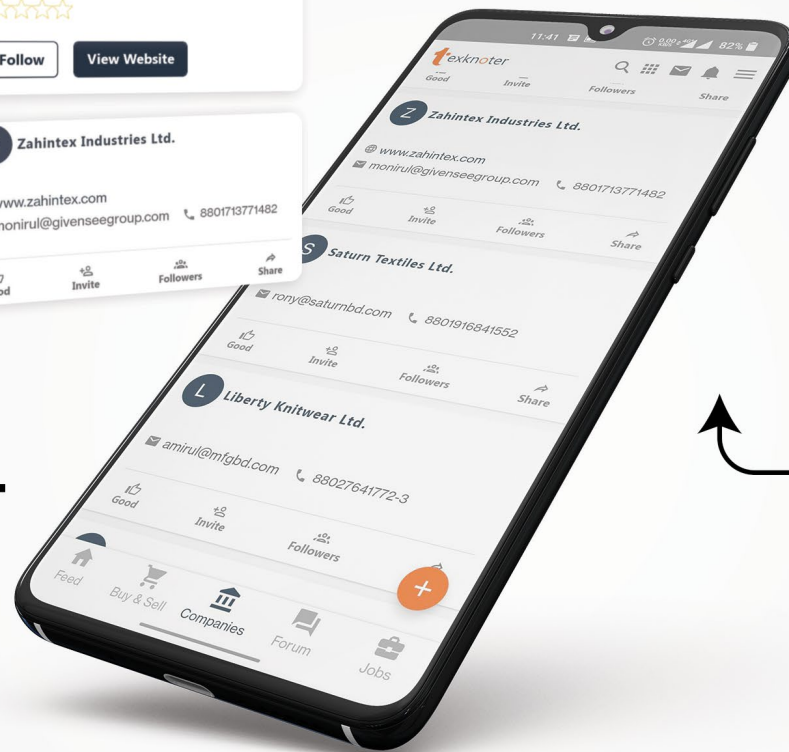
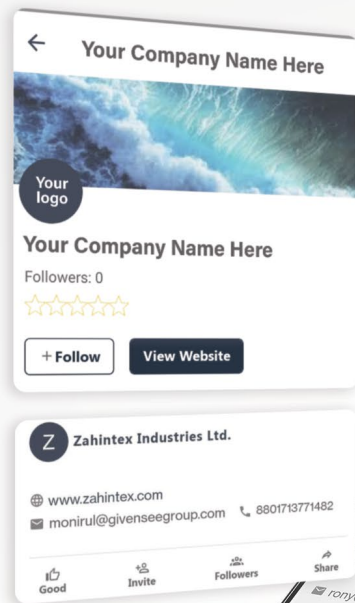
**6. Consumer awareness and demand:** The strategy aims to raise consumer awareness about sustainable and circular textiles. As European consumers become more conscious of the environmental and social impact of their purchases, there may be an increased demand for products that align with the strategy's principles. Manufacturing countries that can meet these demands may experience a surge in export opportunities.

Overall, the EU Strategy for Sustainable and Circular Textiles can shape the behavior of manufacturing countries and the textile supply chain by promoting sustainability, circularity, transparency, and collaboration. Adapting to these requirements can offer new market opportunities and enhance the competitiveness of countries in the global textile industry.

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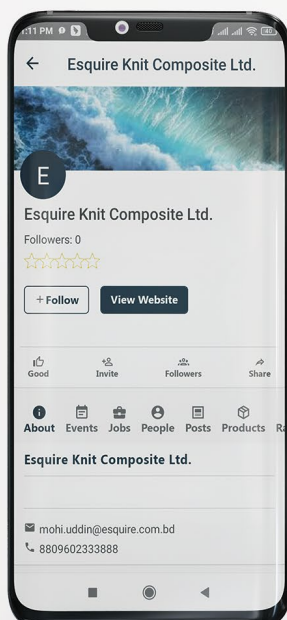
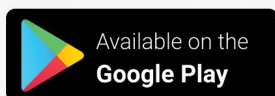
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