ISSUE 5: 2021

BEHIND THE SEAMS OF THE GLOBAL DENIM INDUSTRY

insideDenim

Leaner, cleaner and greener

Rise of the urban factories / From fruit to fibre

Alberto Candiani / PVH's denim focus / Factory Talk

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Editor
Clare Grainger

Technical editor
Sophie Bramel

Consultant editor
Stephen Tierney

Assistant content developer
Charlotte Robson

Associate publisher
Jo Tait

Publisher
Simon Yarwood

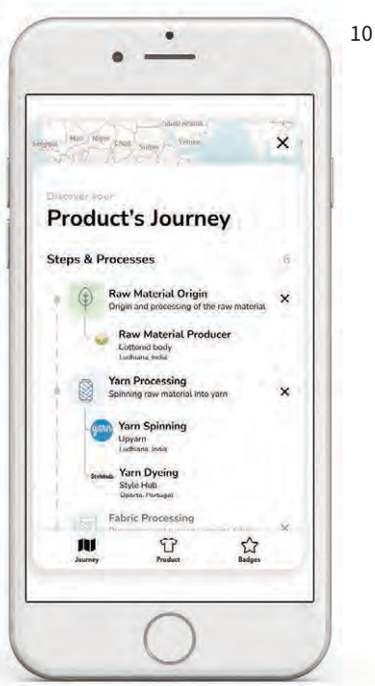
Design
Tim Button

Subscriptions manager
John Collins

Administration
Lisa Fabian-Smith

Editorial enquiries
clare@worldtrades.co.uk

THE SCIENCE BEHIND THE STYLE



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Head Office

World Trades Publishing
36 Crosby Road North,
Liverpool, L22 4QQ, UK.
Tel: +44 151 928 9288

Global Sales Manager
Jo Tait
Tel: +44 151 928 9288
Mobile: +44 74 1598 9103
E-mail: jo@worldtrades.co.uk

@insidedenimWTP
@insidedenimWTP
@InsideDenim
@insidedenimWTP

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BEHIND THE SEAMS OF THE GLOBAL DENIM INDUSTRY

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Moving the needle

As we gear up for Milan, it's a time to consider the positive changes that we've seen over the past 18 months, which many see as acceleration of those that were already under way. One has been the move to increase visibility in the supply chain by adding physical or digital tracers and trackers to fibres and products. This has accelerated as brands saw "an opportunity to reset sustainability goals", according to one company interviewed for 'New Tools of the trade'. We assess how practical and accessible some of the latest solutions are.

We are very happy to have Alberto Candiani, president of the well-respected Italian denim mill, as our guest comment this issue. The launch of its biodegradable stretch Coreva yarn last year in many ways showed a glimpse of what the future could hold when addressing end-of-life solutions for jeans. Circularity is top of mind at Tommy Jeans, too, which has added recycled content to almost 90% of its styles and is expanding its take-back programme to more European countries.

With the opening of some high-profile but smaller denim factories and laundries over the past months, it was impossible to ignore the possibility of reshoring. Advances in technology are making previously unworkable costs more competitive, offering solutions perhaps for shorter runs, closer to customers and a way to sidestep transportation issues. Science Behind The Style also digs into how agricultural waste is providing a new, if niche, source for fibres and dyes.

"Advances in technology are making previously unworkable costs more competitive, offering solutions for shorter runs and a way to sidestep transportation issues"

Design experts Malin Ekengren, Miles Johnson and Sue Barrett let us drop in on their insightful conversation about how the industry has transformed, and which areas need addressing, in Dialogue. Amy Wang, Advance Denim's managing director, is this issue's Jean Genie, and we head to the US and Italy for Factory Talk.

As the world adapts to its new hybrid way of working, hopefully we can all start to merge the best in-person benefits with the advantages offered by digital. The Inside Denim team was thrilled to meet people again at Bluezone in Munich, and will hopefully see some more of you at Denim PV, as well as via the online events.

Clare Grainger
Editor
clare@worldtrades.co.uk

GUEST COMMENT

Alberto Candiani, the president of Italy's Candiani, believes the pandemic could lead to sustainable change, but that global regulations are necessary. He says compostability should be prioritised when it comes to tackling waste, and is proud of the mill's advances with Coreva, a world first in denim fabric innovation.

"If we want to make lasting advances, we must level the playing field"

To say that 2020 was difficult would be an understatement, and I know the entire industry would agree. In many ways, we are still reeling from its impacts. We have all seen raw material costs skyrocket and labour costs increase – both of which will most likely be reflected in our prices.

However, I believe that the pandemic may actually be seen as a booster for truly sustainable change or an equaliser that promotes "re-shoring" and other responsible choices. Indeed, there is more interest in sustainable products, transparency and traceability. This interest is going to stay. Most importantly, consumer behaviours are changing, shifting demand towards more sustainably and ethically produced goods. This is another thing I think is likely here to stay.

The word on everyone's tongue is circularity, which offers many challenges but also immense opportunities. We all must recognise that the current economic model is designed to exceed our planetary boundaries. There is no future for capitalism without circularity. Is it a silver bullet? No. But it is a paradigm shift that must take place in order to start respecting the boundaries of our earth's systems.

At Candiani, we are taking our first strides toward creating a truly circular model that we hope can inspire the rest of the industry. That means continuous R&D, which starts with design. Nowadays, we engineer our fabrics according to their end of life and the issues they might generate when a pair of jeans is "done".

Two of the main issues the industry must face are overproduction and waste. We are now creating materials that facilitate recycling, post-industrial and post-consumer, but also compostability. In general, I believe compostability as an end-of-life solution should be prioritised in a circular model. Most of the industry is focusing on recycling, which is vitally important. However, we must remember that this is more of a mid-life material transformation that still does little to address the issue of waste at a material or product's true end of life – those whose quality is so degraded they simply can't be reused.

Coreva, our latest patent and probably most significant innovation ever, is the world's first compostable stretch denim. It allows even our stretch fabrics to hit many critical sustainability touchpoints. Not only does it enhance performance, comfort and have a beautiful hand-feel, but it can also be turned into nutrient-rich compost at the end of life and used to grow new raw materials while restoring soil health. Likewise, waste from the recycling process can also be treated similarly, creating a tangible solution to make textile recycling far less wasteful.

We were told that was not going to be possible with stretch fabrics. Still, we invented Coreva, which is not just a technology but a vision for a regenerative system and circular model. It is important to stress that we are not making compostable fabrics, so they can simply be thrown away in the compost bin. In fact, our denim is designed to be strong, long-lasting, and durable but now it also offers a positive impact once it can no longer be used.

From here on, we will continue to push boundaries. The true Candiani vision is to link industrial production to agriculture within regenerative systems and practices that would keep production truly sustainable and impact the environment positively when possible. This may seem like a pipe dream, but I honestly believe it is possible and that Coreva is the first building block of this new reality.

That makes me believe the future will be positive. I believe this is the beginning of a whole new era in which Candiani will also eventually evolve from its B2B shape to a model B2C form in which that "C" no longer stands for "consumer" but instead for "citizen".

Over the course of the past few years, we have opened two stores in Milan to engage these "citizens" directly. At Candiani Custom, we craft jeans made-to-measure. And at Candiani Vision, a retail space dedicated to Coreva, we showcase, through educational experiences, what the Candiani vision is about, displaying those regenerative systems and circular models.

As an industry, we must also address the continued globalisation of our supply chains and the perpetual race to the bottom that is making the denim industry even more of a tenuous place. We are all playing the same game with very different rules. If we want to make lasting advances on the sustainable and ethical production front, we must level the playing field. We need to enforce global regulations that hold everyone to the same standards, also including how we communicate about sustainability topics – and we need them now.

“There is no future for capitalism without circularity. Is it a silver bullet? No.”

PHOTO: CANDIANI

Global News

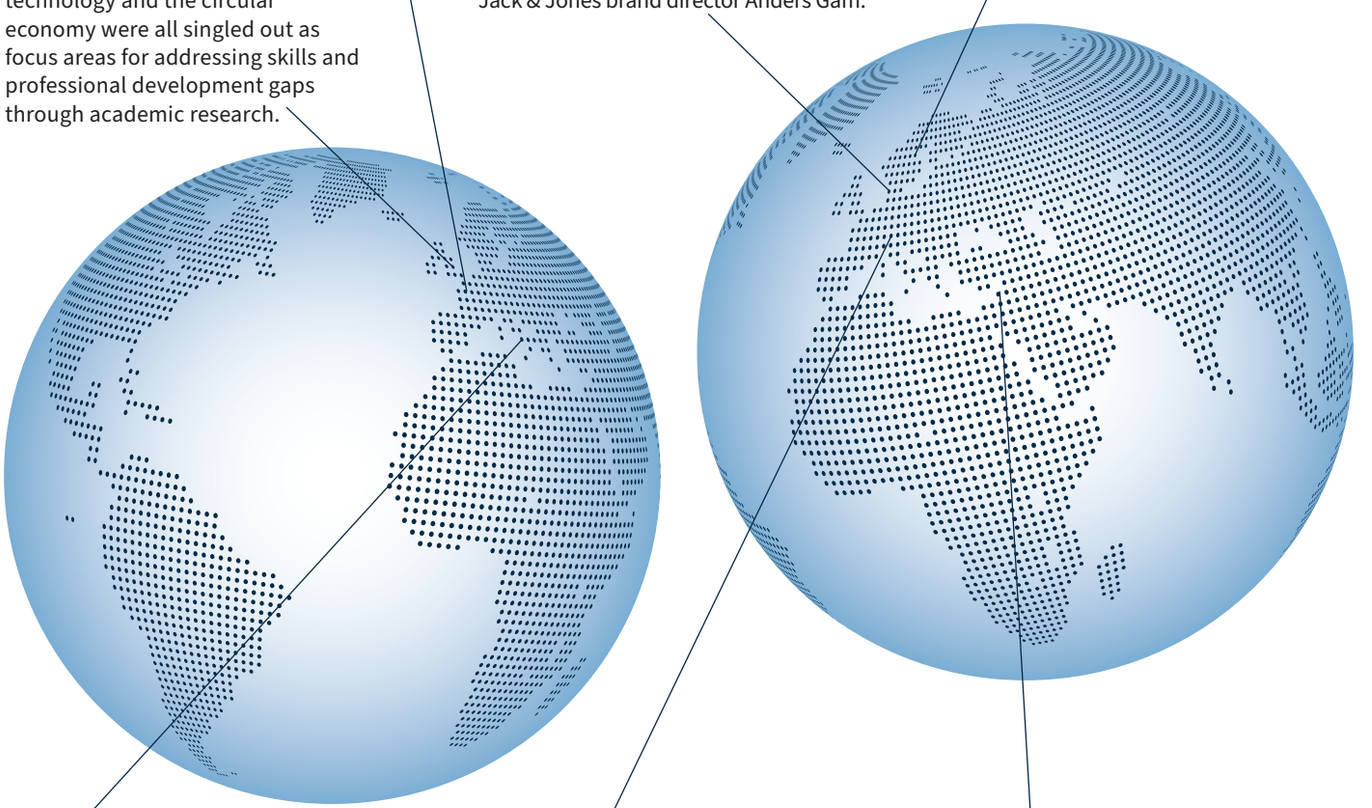
France Jeans brand Ateliers de Nîmes has begun producing denim fabric at its site in the city that gave the material its name. Established in 2014, the brand's founder, Guillaume Sagot, has acquired a weaving machine from another textile company in France and transported it to the company's workshop.

• Marseille-based denim brand Kaporal has signed a two-year partnership with the Calanques National Park, a site that covers 85 square-kilometres of coastal land between Marseille, Cassis and La Ciotat, and a further 500 square-kilometres of marine area. Kaporal employees will take part in litter-picks along the coast.

UK A new University of Leeds research centre, the Leeds Institute of Textiles and Colour, will link industry partners with academics from multiple disciplines across the university and its peer institutions. Technical manufacturing, digital technology and the circular economy were all singled out as focus areas for addressing skills and professional development gaps through academic research.

Denmark Danish clothing company Bestseller has launched JJXX, a denim line primarily targeted at a young, female demographic, and used 300 influencers for the launch. "All the girls represent our brand personality – they are strong, happy, independent, confident and free," said Jack & Jones brand director Anders Gam.

Sweden MoRe Research, a part of Sweden's RISE Research Institutes, is working with denim producer Isko to investigate new cellulosic-based materials, derived from textile waste, to make fabric for jeans. The partners will work with cellulose powders created from decomposed cotton, and combine the fibres with recycled polyester.



Italy Until there is alignment on regulation for the textiles chemicals industry, time and money will be wasted on multiple certifications. That was one message to come out of a panel discussing Chemicals in Denim, featuring Andrea Vernier, managing director of Officina+39; Roberto Camera, CEO of Nearchimica; and Alberto di Conti from Rudolf, as part of Transformers ED Pakistan edition. "The day we manage to free these resources and put them into real R&D, we will progress further," said Mr de Conti.

Austria CIRC, a US-based textile recycling technology provider, and Austrian technology group Andritz have formalised a partnership to bring CIRC's textile recycling technology to commercial scale. The agreement comes after months of trials. CIRC's technology can separate and recover mixed polymer streams, including any blend of polyester and cotton.

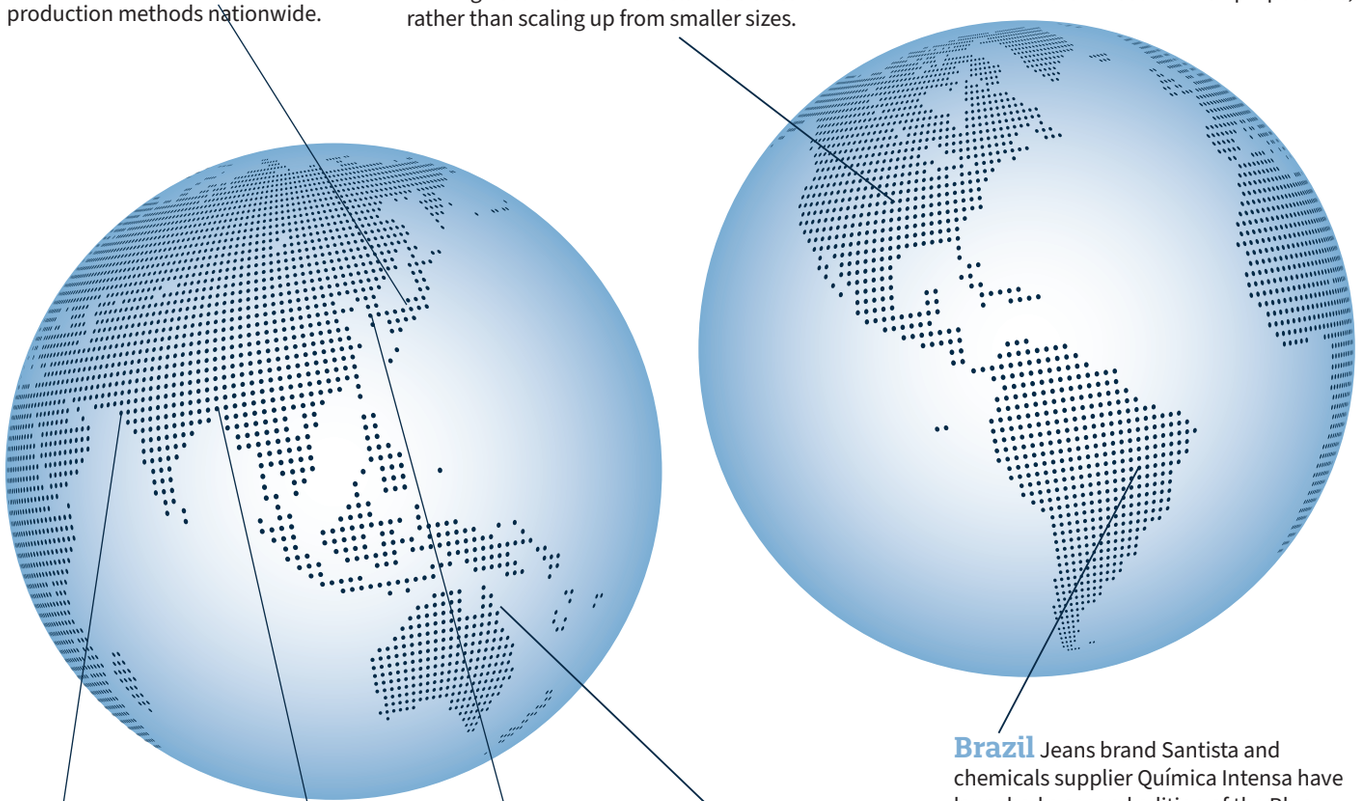
Turkey Jeanologia's team in Turkey have planted 5,000 trees in memory of co-founder Jose Vidal Royo, who died last December. Mr Vidal Royo set up Jeanologia with his nephew, Enrique Silla Vidal, in 1994. The Spanish technology company said: "Today these trees are small saplings, but they will turn into a forest, enriching the soil and becoming a source of oxygen."

US A US-based textile-to-textile recycling project that hopes to develop a circular system includes denim as one of its focus areas. The Accelerating Circularity project is asking for more brands and retailers to take part to scale up the initiatives. Lenzing's head of business development for denim, Tricia Carey, is a director, alongside representatives from Walmart, VF, Eastman, Target and Gap, among others.

- New York-based Sequential Brands, which runs labels including Joe's Jeans, William Rast and Jessica Simpson, entered voluntary Chapter 11 bankruptcy protection proceedings on August 31. It said, as a result of the significant debt, it was no longer able to operate its portfolio and that it would now seek to sell "substantially all of its assets".

- US fashion brand Old Navy will offer all women's sizes with no price difference as part of a drive to "redefine size inclusion" with an initiative called Bodequality. The strategy was formed following "years of research" and design reviews, including scanning 390 women to create digital avatars and running fit clinics with models in US sizes 20-28 to build new "fit blocks" based on their proportions, rather than scaling up from smaller sizes.

Japan Shunsuke Matsubara from textiles maker Kuwamura Textile has dyed denim fabric using discarded strawberries in partnership with a local farmer. It took six months to develop a dye method that is stable and maintains colour fastness. He said dyeing with strawberries represented the first step in a wider process of revitalising traditional production methods nationwide.



Brazil Jeans brand Santista and chemicals supplier Química Intensa have launched a second edition of the Blue Journey competition. The aim is to identify the best technology and technicians in the laundry sector. Around 80 laundries will receive two pairs of jeans and must produce attractive finishes using sustainable practices.

Pakistan Pakistan-based denim mill and manufacturer Artistic Milliners is installing the latest wind turbines as part of a wider investment in renewable energy. The turbines supply its own facilities and feed energy into the national grid. The company is planning further investments in solar and hydro energy.

South Korea The South Korean arm of denim brand Lee, distributed by Seoul-based organisation Barrels, has collaborated with local natural indigo-dyeing artist Jimin Blue on a range of tops and shirts, which will be hand dyed using a traditional Korean method. A spokesperson said the partnership complements Lee's environmental strategy by making sustainability "practical" for everyday life.

Australia Industry body Cotton Australia has confirmed the 2021-2022 cotton season promises to provide a bumper crop. "We expect around 450,000 hectares to be planted although that could increase if there's further rain," said CEO Adam Kay, adding this should yield more than 1 million tonnes of cotton fibre.

Bangladesh Associations including the Circular Fashion Partnership and the Bangladesh Garment Manufacturers and Exporters Association suggest the Bangladeshi garment industry could save $500 million every year by recycling the cotton it uses. During 2019, the country's garment industry produced 250,000 tonnes of recyclable 100% pure cotton waste, including cuttings and yarn. Recycling this could reduce imports by 15%, the partners said.

Global The 2019/20 organic cotton harvest was the largest on record, and volumes are set to "skyrocket" in 2020/21 with a 48% increase expected by the US-based Textile Exchange. Its 2021 Organic Cotton Market Report shows 229,280 farmers grew 249,153 tonnes of organic cotton fibre on 588,425 hectares of certified land in 21 countries.

- Increasing cotton demand, an imbalance in supply and tighter stocks will lead to "bullish conditions" in the market, according to the International Cotton Advisory Board (ICAC). ICAC has revised world exports for 2021/22 upwards to 10.2 million tonnes and world consumption up to 25.8 million tonnes. Production has been revised down to 24.9 million tonnes, mostly because of the lower US crop (down by a third).

Industry News

GenovaJeans celebrates history and future of jeans-making

Diesel sustainability ambassador Andrea Rosso.

GenovaJeans, a new annual event for the denim community spearheaded by the Italian city of Genoa (alongside denim mill Candiani, brand Diesel, art association ArteJeans and sustainability communications agency Eco Age), celebrated a successful five days of talks, screenings and exhibitions on the history and future of jeans-making.

Highlights included displays created in partnership with Candiani and Diesel, plus a new commission by English artist Ian Berry.

Candiani's exhibition was interactive, with a focus on the environmental impact of (and "sustainable" solutions to) jeans production, whereas Diesel offered articles curated from its denim archive – many of which were shown outside its premises for the first time – and exhibited on what it described as jeans' "sustainable future".

The Vicenza-headquartered brand also invited visitors to explore a handmade-in-Italy reproduction of "the first jeans ever documented in history" (reportedly a replica of a Nativity scene garment), in addition to a reflection on the historical relationship between jeans and advertising.

Ian Berry's contribution, a donation from the artist, took the form of a 106 x 77 x 6-centimetre denim assemblage, titled Portrait of Giuseppe Garibaldi. (Garibaldi, 1807-1882, was an Italian patriot and military general known to have worn trousers made from hardy bleu de Gênes – or "blue jeans" – fabric.) The work currently hangs in Genoa's Risorgimento Museum.

Visitors were treated to a guided tour of the Blu di Genova collection inside the city's Diocesan Museum. Considered by some to be the "ancestors" of denim jeans, the so-called Passion canvases on jeans fabric depict various moments in the Passion of Christ and were created during 1538 and the end of the 17th Century. Organisers emphasised Genoa's denim heritage and history of creativity throughout the event.

Euratex proposes industrial-scale hubs

The European Apparel and Textile Confederation (Euratex) has published its vision for a European strategy for textiles and clothing which it says lays the foundations for a competitive and sustainable industry.

The European Commission is due to publish its EU Sustainable Textiles Strategy and a "transition pathway", and the association wants to contribute.

It said compulsory textile recycling – by 2025 and even before in some member states – is a challenge, but also an opportunity for the industry to develop a coordinated recycling strategy at European level. It proposes an industrial-scale recycling hub with capacity to collect and upcycle 5 million tonnes of textile waste.

It said: "Many of the technologies for making that transition already exist but investments are needed to bring the circularity to industrial scale in the European textile sector. Capital base within the industry is limited and most companies are small or medium sized. It is important therefore to focus funding and investments to support and scale innovations, eg, advanced bio-based and recycled materials, technologies, green production technologies and advanced multifunctional products."

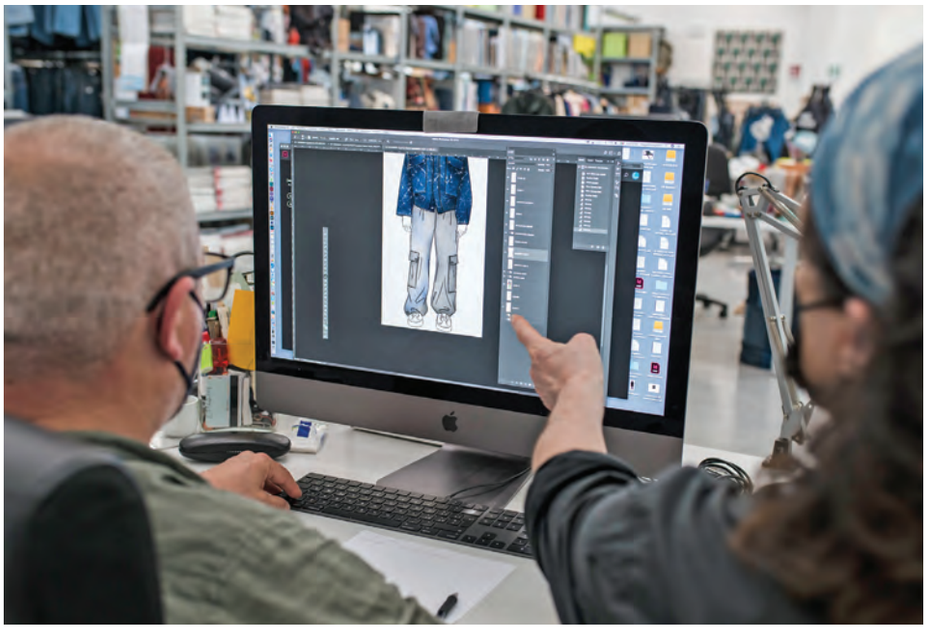
Royo's lowest impact denim
Spanish fabric producer Tejidos Royo will work with textile technology company Tailorlux to produce low-carbon denim. Royo will use cotton grown in Spain; Tailorlux will provide a polymer or viscose marker fibre that, combined with blockchain technology and artificial intelligence, will allow this cotton to be traced throughout the supply chain. Royo will use its Dry Indigo foam dyeing technology to dye the fabric.

Lycra launches Adaptiv fibre
The Lycra company says new fibre Adaptiv will allow brands to make garments that offer a better fit "for various lifestyles, movements and body types". It described the polymer as "revolutionary". Garments that brands produce using Adaptiv will alter their "compressive holding force" to deliver good fit and shape whether the wearer is at rest or in motion. The garments will be durable, Lycra stated, and even be easier to take off and put on.

Rudolf launches Cycle-Logic
Germany's Rudolf Group has launched three chemical auxiliaries for textiles from post-consumer recycled polyethylene terephthalate (rPET) bottle flakes, named Cycle-Logic. Rucogen Upcycle RNB is an "advanced" anti-backstaining dispersing agent for indigo washing. The two other products are Feran Upcycle ICT, an "intelligent" moisture management technology, plus Rucolin Upcycle SDS, an "all-in-one, multi-functional, high-affinity" polymer dyeing auxiliary for polyester.

Officina+39 promotes 'trustability'
Italian chemicals company Officina+39 revealed its "trustainability" collection, Better Seasons, at Bluezone in Munich. The key pillars include innovation, sustainable practices, transparency and social responsibility, according to the company. Officina+39 singled out its Aqualess Mission and Recycrom (a coloured powder dyestuff upcycled from textile waste) offerings. It has also partnered Swiss chemical verification company Bluesign.

Garmon sets up Chinese lab
Garmon Chemicals, a San Marino-based textile auxiliaries unit of Kemin Industries, US, has opened a Garmon Studio fashion laboratory in Jiangmen, China. Garmon Studio has also joined the Ellen McArthur Foundation's Jeans Redesign project, joining 100 manufacturers, fabric mills, retailers and brands.



Partners flex into spine of circularity

Project founders Lenzing, Meidea and Officina+39, plus seven associated companies (Calik Denim, Tejidos Royo, Crafil, Dr Bock Industries, Ribbontex, Spring 85 and RGT Laundry), together launched the second edition of their Circle Book at Bluezone.

"We aim, through our actions, to trace a new path in education for future generations of mindful designers," the ten collaborators said.

The intention behind the "backstage"-style publication is to contribute towards a creative and sustainable fashion model, stemming from open, synergistic partnership (including increased supplier connectivity and cohesion) and the "virtuous", circularity-minded inspiration to innovate and improve.

Meidea founder Lucia Rosin told *Inside Denim* that the work has received much positive interest. She emphasised how the text provides a practical blueprint of how denim "should" be made and highlighted the book's accessibility as a free resource that could make a "serious and concrete" contribution to circularity.

Calik Denim and Tejidos Royo created the fabrics for the collection, many of which contain Lenzing's Tencel-branded Refibra lyocell, a cellulosic fibre drawn from wood pulp and cotton textile scraps. On the dyeing side, Officina+39's Recycrom dye (which creates pigments from waste fabric) was used to make colours including salmon, lavender and emerald. Threads from Crafil, Ribbontex ribbons, plus buttons and rivets from Spring 85, complement the "low-impact" materials, the partners said.

Dr Bock Industries was responsible for constructing the final garments, which were also finished in Dr Bock's RGT laundry. Bleaching and distressing was achieved via Officina+39's treatments, which reportedly boast such credentials as low water usage and permanganate-free formulae.

Soko: Lumia could be a 'game-changer'

Italy-based chemicals specialist Soko Chimica has created fading effects in a process it sees as more than just an alternative to potassium permanganate.

Managing director Matteo Urbini says the "revolutionary" technology could "rewrite" the whitening, fading and bleaching process for denim.

Lumia is based on a single product and there is no need for acids – which could weaken the fabric – or boosters. While the exact details have not been disclosed, Soko says it is easy to apply, offers flexibility and is better for both the environment and workers. Mr Urbini said: "We have gone for a totally different approach, we threw away all previous concepts and we looked at the project from a different angle, because real innovations only come if you change the rules of the game."

Lumia is applied after the wash stage, either locally or sprayed in a machine, and is activated by ozone on the dry garment. Garments treated with Lumia can also be dried and activated later, with no time or moisture limitations, which makes the process more flexible.

Isko invests in recycling technology
Materials specialist Isko has launched a virtual reality "experience" as a way of showing its products and technologies. Isko World has a "room" dedicated to Responsible Innovation, with information about how the company is approaching its environmental and social responsibilities. It has also signed a deal with the Hong Kong Research Institute of Textile and Apparel to use its Green Machine garment-to-garment recycling technology and made a commitment that 85% of its fabric production will consist of recycled material content.

Guess grows green-minded mix
Denim brand Guess has reported an 18% increase (from 3% of its range in 2020 to 21.2% in 2021) in denim produced in line with its green-minded Smart Guess principles over the course of the 2020-2021 fiscal year. The brand's new goal is for 75% of its denim offering to mesh with its Smart Guess philosophy by 2025. For a denim garment to be labelled Smart Guess, the company specified the fabric blend must contain a minimum of 20% certified sustainable materials, plus be produced using methods with reduced environmental impact.

Wrangler launches Infinna denim
Kontoor-owned brand Wrangler has partnered Finland's Infinited Fiber Company to make denim from Infinited's regenerated textile fibre Infinna. Infinna is made from cellulose-rich waste that would otherwise be landfilled or burned, including old textiles, crop residues such as rice or wheat straw and cardboard. Kontoor said this, alongside its water-saving Indigood initiative, plus Jeanologia's water-reducing e-Flow finishing technology makes this collection its "most sustainable denim".

Kaiser promotes bleaching agent
Chemicals group DyStar's subsidiary Kaiser Tekstil has launched a denim collection made with its latest bleaching agent, Lava Con PBA. Lava Con PBA is designed to be "an ecological replacement" of permanganate and hypochlorite. It provides a bright bleaching look and improves the marble effect on denim garments, the company stated. It can be applied by dipping or closed machine spraying and does not require any heating process after the application.

The need to back sustainable and ethical claims is driving the adoption of traceability systems in the denim industry. As paper and pdf-based certificates no longer offer the necessary security, digital technologies promise to provide not only an extra layer of safety but also new services in support of sustainability and transparency.

New tools of the trade

Do you know where your cotton comes from? This is a deceptively simple question. As soon as the raw material is captured by the textile industry, it is blended with fibres from multiple bales and from various farms in a process that deliberately mixes fibres to obtain homogenous yarns. Once spun into a yarn, woven into a fabric and sewed into a garment, it is anyone's guess where the original raw material was grown. The simple question doesn't call for a specific answer, unless a mill or brand has chosen to use a specific type of cotton, Pima or organic, recycled or even carbon positive. Then provenance needs to be proven and certificates secured.

There are roughly two ways to go about this, placing a physical tracer on the fibre is one option, but some systems say they can trace a material using digital tools and data, without marking the raw material itself. Whatever the case, any traceability programme poses constraints on operators and requires an elaborate infrastructure for testing, tracing and monitoring. Without a tracer, online platforms need to map out the supply chain, which is a long and time-consuming process. Convincing, and training, farmers and workers to input data is another challenge.

The value of being able to certify provenance is nonetheless ever more compelling, driven in no small part by legislation requiring companies to guarantee the absence of human rights abuses in their supply chains as is now the case in the UK, US and Germany. The recent tampering of QR codes affecting GOTS-certified organic cotton in India also shed light on the vulnerable nature of conventional paper or pdf-based tracking methods.

The need to back sustainability claims with scientific proof is one of the main reasons mills and brands are looking to trace their goods. Natural materials, such as cotton, pose specific challenges in that they do not come from a clearly identified factory. The farm to gin to spinner stages are considered weak links in the system, pretty problematic as this is where the variety of cotton or agriculture practice provide much of the added value and sustainable attributes of a fibre.

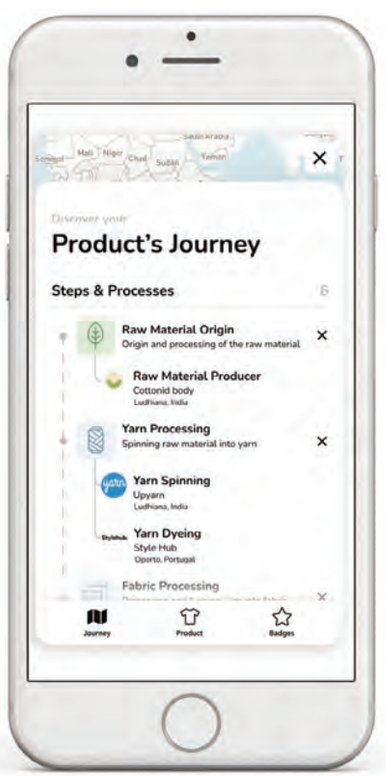
The LEDs on FibreTrace's spectrometer display the proportion of tested material that has a marker. "If a bad player adds 50% conventional cotton to a fabric labelled 100% organic cotton, the signal will indicate it, without having to send a sample to a lab," says Shannon Mercer, FibreTrace CEO.

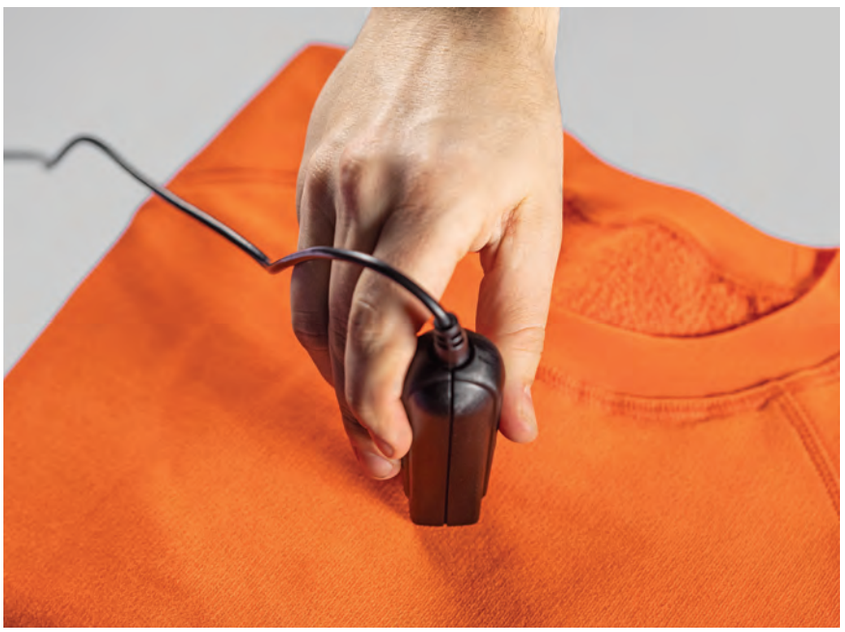
PHOTO: FIBRETRACE

It all starts at the farm, and this is how Australian growers Danielle and David Statham came to develop FibreTrace to keep track of their carbon positive cotton throughout its transformation in the textile and apparel supply chain. After investigating various technologies, they chose a solution based on a luminescent pigment, the same that secures currency and passports. Initial trials were conducted on Good Earth Cotton fibres used by Australian jeanswear brand Nobody Denim last year.

Cotton USA adopted Applied DNA Sciences' SigNature T tracer in 2016 to guarantee its American-grown cotton. The US Cotton Trust Protocol, a science-based sustainability programme launched in 2020, has partnered with a digital blockchain-backed platform developed by Textile Genesis.

Vertically integrated companies are also finding it necessary to better monitor and trace organic or recycled content. To align its material processing with its circular and sustainable goals, Pakistan-based Artistic Fabric Mills (AFM) is using a tracer-based technology developed by Aware, a Dutch start-up. Artistic Milliners, also based in Karachi, has chosen a digital solution created by retraced, a German start-up. It is being introduced into a cotton improvement scheme with 500 cotton farmers in the Rahim Yar Khan region of Pakistan. "This programme is designed to improve the quality of Pakistani cotton by supporting and training farmers and it provides them with an accounting system that gives them a better view of their finances and a better understanding of the resources they use to grow their cotton," retraced co-founder, COO and CMO Philipp Mayer tells *Inside Denim*. He believes it is essential "to engage farmers in the process" as "they will get paid extra if they deliver higher quality cotton".





Physical vs digital

From DNA tracers to phone apps, a wide array of technologies is thus being deployed in the denim industry. Promoters of DNA-based systems believe they provide robust forensic evidence that holds up in court. Applied DNA Sciences, based in Stony Brook, US, has long experience with its technology as it is used on paper currency. "Our technology is solid, DNA is recognised as a forensic marker that is admissible in court," says MeiLin Wan, the company's vice-president of textile sales. DNA is a good match for cotton, she says, due in part to its chemical structure (hydrogen and oxygen) and to the double stranded molecules that provide dual binding. Furthermore, "identifying the presence of DNA has benefited from exponential progress in Polymerase Chain Reaction (PCR) tests," she says.

Swiss company Haelixa also bases its concept on DNA-based tracers it initially developed for precious gems before expanding into textiles in 2018. The marker is sprayed or applied during any wet process and is one of the few GOTS-approved tracers for use on organic textiles. "Our application method is mostly-water based, it doesn't have any harmful chemicals. It is also used in minute quantities. We can identify a tracer even if it is under 1 ppm," Dr Michela Puddu, company co-founder, tells *Inside Denim*. "We can generate as many DNA sequences as needed, and they cannot be altered." Diamond Denim, part of Pakistan-based Sapphire Group, is using Haelixa's system for its recycled cotton.

Aware, a traceability system launched by Dutch start-up The Movement, has chosen nanoparticle-based tracers backed by a blockchain technology which was initially developed for plastics by Circularise, a spin-off from the Delft University of Technology. Recent adopters of this technology include Denim Deal, a consortium of companies promoting the use of recycled cotton, and Turkish denim mill Çalik.

(Top): Aware combines a nanotech tracer with a blockchain, which it says is the only way to provide 100% certainty. A QR code will not offer the same level of security, and blockchain alone is not a solution, it is only a tool, says Koen Warmerdam, Aware brand director.

PHOTO: THE MOVEMENT

(Left):Digital platforms can provide high quality sustainability data that can drive sales, says retraced.

PHOTO: RETRACED

A physical marker is not a stand-alone system. Its application is always recorded in a database, and more often than not backed by a digital twin or token, stored in the cloud, and copied and secured in a blockchain. This online platform follows a material's progress in the supply chain, validating each operation, as new data is input, and the tokens move on to the next stage.

The application of a physical tracer implies a small additional cost that the promoters of these systems strive to keep as low as possible. "Transparency shouldn't have to cost the earth," says FibreTrace CEO Shannon Mercer. He says FibreTrace adds less than 2 cents on a T-shirt, and will lead to higher sell through rates. Aware supplies the tracer and sells tokens corresponding to the tagged merchandise. The Movement invoices a percentage to the spinner and to the final customer, brand or retailer, based on quantities purchased and number of tokens. "We have designed this system to keep the price of yarn as low as possible," says Aware brand director Koen Warmerdam. He estimates that it can add 2-3% to the cost of a finished product.

Other solutions in development do not rely on a physical tracer but use sophisticated algorithms and statistics to monitor a material throughout its processing. Oritain, a company founded in New Zealand with offices around the world, uses forensic science to verify the origin of products based on the environment in which the cotton (or other natural material) is grown. It says that "everything that is grown or reared absorbs a unique ratio of elements and nutrients from its environment" which constitutes its 'Origin Fingerprint'. Oritain takes samples on farm sites to establish the Origin Fingerprint and stores the information in its database. Using forensic science and statistics, it can analyse a sample of a product and verify the origin against the reference fingerprint stored in its database. Although processing and treatments can affect concentrations of some naturally occurring elements in a product, Oritain says it can verify origin at any point in the supply chain. In the last year, the company says it has continually audited and validated Cone Denim's supply chain to verify the responsible origin of its cotton.

Oritain believes the only way to be sure if a product or raw material is authentic and true to its claimed origin is to test the actual product itself. It identifies an Origin Fingerprint for any material based on the environment from which it comes.

PHOTO: ORITAIN

"Transparency shouldn't have to cost the earth"

SHANNON MERCER, FIBRETRACE

Algorithms & statistics

The systems that do not rely on a physical tracer need to model a company's supply chain, its materials, processes, styles, customers, and possibly more, so that any anomaly or suspicious transaction can be spotted. This implies a strong digital infrastructure and considerable data to feed the statistics and algorithms that will monitor materials. The advantage they promote is that the data can include a great amount of information, including a material's impacts. They can thus provide not only traceability but also sustainability metrics that can be shared across all partners within a supply chain. This is what retraced, the company founded in 2019, offers with its online platform. It is a system that provides verified, certified information to brands and consumers in an easy to use and graphic format. "Our goal is not only to promote transparency, but also better practices from the farm onwards," says Mr Mayer, in reference to the programme with Artistic Milliners mentioned earlier.

Retraced believes brands also stand to gain by implementing the system, based on a case study with sustainable LA denim brand Boyish. When a retraced widget was placed on its e-shop, and customers interacted with it, it led to a 13% increase in online conversions.

The fully digital traceability solution developed by Textile Genesis can be paired with a physical tracer, but can also work without one. The start-up based in Hong Kong and Bangalore, India, compensates for the absence of a marker with in-depth data of all manufacturing processes. For each kilogram of fibre from a verified point of origin, the platform generates a digital token, or Fibrecoin, which, at each stage of manufacturing, will be matched to an algorithm for authentication. A spinner will input the count and composition of a yarn, and the Textile Genesis platform can monitor blends. “A 100 kg of Tencel can be used to make a 50% Tencel/50% cotton yarn, now representing a volume of 200 kg of yarn. If a spinner tries to register 201 kg, our system will block the transaction,” says Textile Genesis CEO and founder Amit Gautam. His example is a theoretical one, as the company’s model integrates average wastage for each manufacturing stage. “We have modelled the entire supply chain in detail, down to grammage in weaving. It is not mass balance, it is the reality,” he says. “The level of granularity provides high robustness. The algorithm will block any transaction that is deemed not physically possible.” Unsurprisingly, the modelling of industrial processes was a time-consuming one.

Swedish start-up TrusTrace has also spent a lot of time mapping out processes and inputs, including data specific to each customer, such as materials, styles and purchase orders. Its system is designed to work not only with a company’s existing product management software but also with sustainability platforms such as the Higg Co’s modules and certifications managed by Textile Exchange. The company has also taken care to make its solution easy to use.

“The pandemic has accelerated interest,” says TrusTrace co-founder and CSO Hrishikesh Rajan. “Large and small brands saw it as an opportunity to reset their sustainability goals.” Suppliers have also shown interest, as they may risk losing business if they cannot provide robust guarantees. “The data we provide can be used by companies in their sustainability and ESG reports,” he adds.

Though these digital platforms do not need a physical tracer, they can integrate any type of marker in their systems. Unifi embeds a proprietary tracer in its Repreve-branded recycled polyester, as does Lenzing in its premium Tencel and Ecovero fibres.

“The data we provide can be used by companies in their sustainability and ESG reports”

HRISHIKESH RAJAN, TRUSTRACE

The TrusTrace management team. In the past year the company has grown from 40 to 100+ employees.

PHOTO: JEAN LAPIN

Now that these systems have become operational, for the most part, the next step for them is to attract widespread adoption. But farmers, ginners, mills and manufacturers now face multiple choices. Understandably, they would like to see a single unified or interoperable method emerge that will cover the demands of a wide swathe of customers. Others point out that these programmes require suppliers to share sensitive information, and to be truly fair, data sharing should go both ways. What type of information should be conveyed to consumers is another question that industry insiders raise.

The developers of these solutions also need to contend with the specifications and details of diverse standards, certifications, and even multiple certificate formats. “Everyone is feeling the pressure to be more transparent, even standards are being pressured to modernise and harmonise their systems,” points out Mr Gautam at Textile Genesis. But he sees the entire industry progressively working its way to digitalisation. For Mr Rajan, “we will see consortium blockchains emerge in the future, and brands working together more.” Admittedly, the sustainability issues the industry faces go far beyond the scope of a single company. The denim industry is not only increasingly inextricably connected, it is also increasingly collectively accountable.

ADVERTORIAL

Cindy McNaull, CORDURA® Brand Business Development Director discusses consumers' heightened awareness of the value of protection, post pandemic.

Durability and reliability are more important than ever

Q You have worked within the polymers and textiles industry for many years. What are the biggest changes you've noticed over the last few years, and where do you see the market heading?

A This is a challenging time for our industry, and it's how we deal with this as a collective global textiles community that will help define and set the foundation for the future.

Trend indicators suggest that post pandemic, consumers have a heightened awareness in the value of protection. They are also becoming more and more drawn to timeless products that make them feel safer, more comfortable and in control. Durability and reliability are more important than ever and represent a significant shift in attitude when it comes to purchase behavior.

This mindset aligns well with our long- standing mantra of creating durable advanced fabric technologies that will stand the test of time. The CORDURA® brand is firmly rooted in a military and workwear heritage and has helped provide protection for soldiers and workers for over 50 years.

The future of fashion really nods towards the incorporation of performance attributes- both overt and covert. Fabrics with combined benefits such as durability mixed with all season comfort and versatility.

Could you explain, for people who don't know, how CORDURA® adds strength to fabrics?

CORDURA® fabric is a primary ingredient in many of the world's leading high-performance gear and apparel products ranging from casual apparel and activewear to footwear, backpacks, military/tactical wear, and workwear. The CORDURA® brand is a registered trademark of INVISTA, one of the world's largest integrated polymer, intermediates, and fibres businesses.

Our CORDURA® fabric portfolio offers long-lasting performance benefits. They are designed to be extremely versatile and reliable, with renowned durability at the core. These performance benefits make CORDURA® particularly well- suited for today's lifestyle living – from the office to the climbing gym, the morning commute to the afterhours drinks with friends. CORDURA® offers an invisible layer of protection which means you can push your own personal limits knowing that your product is stylishly durable for all occasions.

PHOTO: CORDURA

CORDURA® ingredient branding serves as a tool for product differentiation and builds equity among modern consumers who prioritize durability, performance and style.

How does this fit in with durability and/or with the concept of sustainability?

Because our fabrics are long-lasting and therefore need to be replaced less often, they can help contribute to building a more sustainable world for all of us.

The world has clearly changed. People, rightly, demand more from what they wear and want to feel good about what they buy; they are conscious that their choices have an environmental impact. At work, and at leisure, we are all being challenged to think about how and where we can use resources more efficiently.

At CORDURA®, we help engineer products that are built to last a lifetime.

CORDURA® Denim launched in 2010. How does this sector differ, and what are some of the standouts from the decade?

For CORDURA® the last ten years have been what we are calling 'The Decade of Denim.' During this time, we have looked very closely to see the way this sector differs from others and gain greater understanding of its particular needs. 2021 marks the 10th anniversary since the introduction of the durable CORDURA® Denim technology into the technical denim space – an innovation which we pioneered with Artistic Milliners. As the decade progressed, we and our partner mills continued to explore, engineer and create new concepts for the denim world, aimed at 'pushing performance' to higher and higher levels and educating consumers to 'demand more from what they wear.'

We have been able to excel in this space because, technically speaking, CORDURA® Denim is proven to be at least four times more durable than traditional 100% cotton equivalents*. This is why it's established a fan-base as the comfortable, durable option for skateboarders, climbers, cycle commuters, workers and motorcyclists. Always durable, always hardworking, CORDURA® Denim gives an authentic denim look and feel with enhanced protective performance no matter what the environment – be that urban jungle, building site, mountaintop, or simple everyday lifestyle living.

**Based on 465 g/m² denim fabric*

Invista/Cordura has a strong focus on R&D. Does the research team strive towards particular goals? What is important in terms of new developments?

The CORDURA® brand itself was born out of the need for innovation, and the past fifty years or so have been a continuous scientific quest for ever-greater durability across a wide variety of fabric applications and end-use market segments. This has seen us make serious commitments to our investment in new R&D facilities and programs. One such example has been our focus on high tenacity staple nylon 6,6 blends with natural performance fibers such as cotton, Lenzing TENCEL™, wool, and most recently hemp.

To help put CORDURA® fabric technologies to the test, last year we debuted our CORDURA® Lab to Life™ multi-faceted testing protocol. Longevity underpinned by durability is the foundation of the CORDURA® ethos, driving our innovation pipeline and reflecting our brand DNA belief that "Sustainability Begins With Products That Last™."

What we consider to be of prime importance in terms of new developments is helping our customers respond to today's market challenges. This includes meeting the consumer and end-wearer demand for greater durability, flexibility of purpose and sustainability. Bringing our passion and commitment to innovation, we've teamed up with our supply chain and retail partners to listen and identify the consumer's unmet needs, collaboratively solve problems and invent cutting-edge solutions – and ultimately designing with true purpose.

How have you adapted to working during the pandemic?

There has been a lot of uncertainty during Covid-19, and we have all faced the challenge of personal connectivity in a digital world. The pandemic has given us a chance to reset and rebuild something better than before. Experimentation, agility and entrepreneurial thinking are core values of INVISTA and the CORDURA® brand, and during this past year we have continued our focus on developing future-proof transformative tools such as our new CORDURA® Fabric Finder, a wonderful tool designed to bring durability to your desktop.

A recent partnership with Artistic Milliners has resulted in a Cordura hemp denim. What do you see as the possibilities for hemp blends?

We're really excited about this latest development with CORDURA® Hemp Denim, and I'd like to say a big 'thank you' to our partners at Artistic Milliners for their help in bringing this to fruition.

Like us, Artistic Milliners were obviously quick to appreciate that Hemp offers the benefits of enhanced abrasion resistance, tensile and tear strength – three qualities which align to the long-lasting performance platform of the CORDURA® brand. Together, we explored the aesthetic advantages and eco-efficient properties that hemp can bring to innovative CORDURA® technology developments. This meant working with nature, creating a fusion of 'Hidden Science' to push the boundaries of durability and a 'Performance Natural' aesthetic that's both contemporary and constructive. Overall, hemp blends bring synergistic fiber properties to the high tenacity, strength, durability, versatility and sustainability of the CORDURA® advanced fabric portfolio.

What advice would you give to someone wanting to follow in your footsteps, career-wise?

The best advice I could give to anyone just starting out is this: be brave, believe in yourself, and never be afraid to step outside the box. But equally important, listen to and learn from everyone in the business that you come into contact with. Benefit from their wisdom and experience. Be an agile thinker and pivot this to guide your own development to achieve your personal and professional goals. Find out what you're good at, what you're passionate about and how you can make a real difference. Remember, too, that personal growth will often take you to the edge of your comfort zone – but embrace the challenge. Do this and your limits will be boundless .

CORDURA® Fiber

INVISTA™

Leaner, cleaner & greener

Once upon a time, bigger was better. Vast vertically integrated denim manufacturing factories were, and still are, the pride of many companies in the global denim industry. But what they provide in terms of efficiency, cost and scale is not without drawbacks. They can entail long lead times, high volume minimum orders and generate excess inventory, which is proving to be increasingly costly both financially and reputationally. Add in rising wages around the world, hikes in transportation rates and duties, pressure to address environmental issues, belief in growing consumer demand for locally made products and the prevailing perceived advantages of producing clothing in these mega facilities could turn into a disadvantage.

Factor in the evolution of technology, the development of automated sewing machines and finishing devices, and the stage is set for Industry 4.0 and a new mindset. It is a move spearheaded by one of the world's leading denim manufacturers no less. Saitex's first manufacturing facility outside of Vietnam opened in March 2021 in Los Angeles, equipped with state-of-art machinery that can produce 2,000 jeans a day. "Saitex USA provides an opportunity to bring sustainable manufacturing and jobs to the United States, a first step in re-evaluating and reinventing global supply chains," declared Saitex CEO and founder Sanjeev Bahl.

The evolution of technology, the disruption of supply chains during covid and pressure to address sustainability issues in the denim industry is driving a radical rethink of the industrial landscape. Mills and brands are investing in next-generation factories located closer to their customers and consumers, paving the way to a reshoring of production.

This self-proclaimed 'Factory of the Future' owes much to extensive research, development and investment by SIP Italy, a company that has been working with Saitex for five years to design the machines that make it possible to manufacture jeans in high wage countries. It has supplied the equipment installed in C&A's new facility in Mönchengladbach, Germany, and in Fashion Cube's in Neuville-en-Ferrain in the north of France. Other 'urban factories' are in the works in France, Italy and the Netherlands, Giorgio Morandin, Factor-Hit CEO, tells *Inside Denim*. "We reworked ideas that were in development in the 1980s and 1990s. Italy has a strong denim heritage, and manufacturers were at the time already looking for solutions to reduce staff," he says.

Local pride: Saitex's new facility in the US is one of several urban factory projects in development with equipment supplied by Factor-Hit.

PHOTO: SAITEX

The success of Factor-Hit is the result of a meticulous calculation of all parameters related to jeans manufacturing and finishing, timing each operation, taking into account local wages, energy rates and even the cost of building a facility. The main bottleneck in clothing manufacturing is the labour-intensive sewing, which Mr Morandin says is the main reason it was offshored. But, he says, two parameters change the equation: the first is reducing the number of workers, the second is reducing the skills needed to operate the machines. "We have adapted to the market context and each factory is tailored to a customer's specific needs," he says. Why now? "The pandemic triggered a change in thinking. Mass market brands especially felt the need to inspire their consumers with new story telling."

Local jobs and consumers

When *Inside Denim* spoke to Christian Kinnen, director of Fashion Cube, the company was in the process of recruiting collaborators. "We are seeking to be as inclusive as possible, hiring people who have been out of work or had difficulty finding jobs and our project is enthusiastically embraced by local job seekers," he says.
Mr Kinnen has been nursing the FashionCube Denim Center project for a number of years, making his first proposal in 2017 to the Mulliez family holding company, the Association Familiale Mulliez (AFM). At the time, he was in discussions with Softwear Automation to install Sewbot equipment, but he says the technology was not ready and ended up adopting SIP Italy's Factor-Hit concept.

A conjunction of converging trends made the project possible, he says, in addition to the evolution of technology. He cites the fact that six of the group's brands were rethinking their business models to set up a production facility in France and produce only what consumers buy. "They accepted to pool their resources to lower their environmental impact and make the project possible," he says. "Recent events have made it even more relevant." He believes that consumers are prepared to pay extra if a product has added value. "Consumers are well aware that buying a garment that is made in France helps create jobs and reduces its carbon footprint," he says. The €3.5 million facility will produce 2,000 jeans a day. These will retail from €40-60, 20-30% more than offshored products.

"Over the past few years, we've seen a resurgence in demand for goods that are made in America. As the original global hub for denim, there's a real pride that comes with quality denim from Los Angeles and the consumer knows that," concurs Saitex USA CEO Kathy Kweon.

The thinking behind C&A's Factory for Innovation in Textiles (FIT) follows a similar line of thinking. The mass market retailer believes the added value of local manufacturing makes a bold statement and proves that sustainable fashion need not be a niche category, says Betty Kiess, head of corporate communications Europe.

Earlier this year, Karachi-based Artistic Milliners purchased a denim factory in Los Angeles, with the intention to create an Industry 4.0 design and production hub. "In 2021, we anticipate increased demand from international retailers and brands for near-shoring capacity, digital design services and sustainable solutions. Our investment in this factory gives us a launch platform in the US to meet the demand as we build the factory of the future," says executive director of Artistic Milliners, Murtaza Ahmed. The facility, renamed Star Fades International (SFI), processes 100,000 units per month and, according to the press release, will grow to a capacity of 300,000 units per month. SFI is currently a laundry facility, but the company says it works with LA-based garment contractors for clients who want full made-in-America production.

Tissages de France, based in Rupt sur Moselle, is yet another example of investment in local manufacturing. Thomas Huriez, founder of French denim brand 1083, saved the operation from bankruptcy in 2018, and it will be adding jeans manufacturing to its denim making operations starting this October. "1083 has been growing by 30% every year, and now sells nearly 10,000 pairs of jeans per month," Denis Heinrich, factory manager, tells *Inside Denim*. The automated sewing machines will enable the company to produce up to 10,000 jeans per month and accompany the growth of the brand specialising in jeans and sneakers Made in France.

Six Mulliez-owned brands have teamed up to bring to life a jeans making facility in the north of France.

PHOTO: FASHIONCUBE

Clean and lean

The reshoring of jeans production predates the pandemic, as demonstrated by Turkish conglomerate Taypa that has been operating a state-of-the-art facility in Kraljevo, Serbia, since 2019. Its Eurotay factory produces 200,000 jeans per month (2 million a year), with plans to reach 7 million yearly by 2025. Its current staff of nearly 1,000 is expected to grow to 2,500.

"We chose Serbia not only for its proximity to the European Union but also because we can run an agile, high tech, autonomous facility with a skilled workforce. We can produce jeans for European brands and retailers without generating excess stock, they can order what is selling in stores with short production lead times and transport time," says Burak Karaarslan, general manager of Taypa.

"Interest definitely surged during the pandemic as brands faced many supply chain issues, either because goods were not being delivered, or they were left with inventory that they couldn't sell," says Eurotay factory manager Umit Enis. "Our facility is much more flexible than conventional factories, we can stock raw denim fabric and garments, and apply finishing or modify it to adapt to evolving trends."

"A lasting effect of the covid pandemic has been a re-evaluation and redesign of supply chains as customers face longer lead times than ever before. By shifting production to the US, we've largely been able to avoid this pitfall," says Kathy Kweon at Saitex. "Our local state-of-the-art facility can produce a high quality, sustainable product that consumers are looking for, and do so at a price and speed to market that puts Saitex USA a step ahead of the competition."

On a broader level, Murat Soylu, general manager of Eurotay, points out that manufacturing in remote countries adds costs that are not usually factored into the business-as-usual model. "When buyers place an order six months ahead without knowing what is going to sell, brands risk acquiring inventory that will become deadstock or be marked down. When you add freight rates and duty or custom taxes, the real cost to the brand is the total cost of ownership. It may seem logical to buy from cheaper regions but in the bigger picture, the cost of goods is more expensive than buying from a local supplier if the product does not perform and lies in the warehouse," he points out.

Creativity & reactivity

"When I started working in the denim industry, companies would produce their goods in-house, they had staff dedicated to pattern-making and prototyping and even had small laundries. People worked together, shared knowledge and expertise," says Lucia Rosin, head of Italy-based denim design lab Meidea. The move to outsource changed all that, imposing rigorous management and allowing for less flexibility. "Mass market became mainstream, brands competed on price alone, this led to price wars and flatness of product," she says. It may cost more to produce in the new local micro factories, she says, but they also offer the possibility of producing shorter runs and allow designers more leeway to develop special ranges.

Eurotay, part of Turkish group Taypa, has been operating a highly automated facility in Serbia since 2019.

PHOTO: EUROTAY

She points out that indie brands have no way to produce small-scale runs that number in the few hundreds. Giorgio Morandin, at Factor Hit, agrees: "If a designer wants to make 100 pairs of jeans, it is not possible to produce them in Asia. Designers and small companies need access to local and on-demand manufacturing." The same goes for mass market players, he says. "To be successful in a fast fashion market, a retailer needs to follow market trends closely while remaining in an acceptable price range."

Reducing carbon emissions

Environmental and social considerations are another key motivation for the creation of these futuristic denim fab labs. A few of the new facilities have taken over former industrial sites. C&A's FIT found a home in a historical Monforts textile machinery factory and Taypa's in a closed bus factory. Mr Morandin points out that building a new facility incurs high carbon emissions, citing a Saitex project in Detroit that would be housed in a former factory. C&A intends to make its FIT facility "carbon free" by combining renewable energy sources with regional production and sourcing. Brands and retailers are also keeping an eye on discussions within the EU on the creation of a carbon adjustment mechanism that could lead to a carbon price placed on imports as part of its Green Deal.

In addition to rehabilitating urban industrial sites, the automated nature of these facilities means that inputs and outputs are easier to measure and monitor. "We can share all sustainability-related data with our customers," Banu Acun, Taypa sales and marketing director, tells *Inside Denim*. "Brands that have set goals to reduce their impacts increasingly request this information. To reach their targets they need to measure and show progress." The company joined the Ellen McArthur Foundation Jeans Redesign Project this year, which she says aligns with its own sustainability goals. "We could be a solution partner for brands looking to reduce their carbon footprint. In the next five years, it may become compulsory that products provide Life Cycle Assessment (LCA) or Environmental Product Declaration (EPD) information on a label, like a care label, to be sold in Europe. We need to be ready for that as manufacturers."

Blue Matters, which includes two state-of-the-art facilities recently set up by the Ereks Garment and Era Denim group, is another example of a smart and sustainable denim fab lab that the Turkey-based group has invested in as part of its roadmap to circularity. It is spread over two sites, one in Istanbul dedicated to stitching and the other in Çorlu, which also houses a laundry. Powered by 100% renewable energy, they can produce jeans using only 10 litres of water per item, instead of the industry average of 40 to 60 litres, in Turkey, Kaan Şen, business development manager and circularity manager for Ereks, tells *Inside Denim*. Building a micro factory is in the group's plans, he says, to offer just-in-time manufacturing, customisation options and produce shorter runs at cost-competitive rates. "A new automated stitching machine has just been installed in the Istanbul facility. It is a game-changing machine as one or two people can make up to 2,000 jeans per day," he says.

Finishing labs requiring very little water are also being relocated closer to where brands develop their products, as seen at Turkish denim group Isko, which is setting up one of its Creative Rooms in London with new equipment that will be trialled by Hiut Denim Co. The Nanobubble Technology has convinced the Welsh brand to release its very first light washed jeans using the nebulisation system that radically reduces water consumption.

True to its local ethos, British indie brand Blackhorse Lane plans to install a mini wash lab in its manufacturing site located in a 1920s factory building in Walthamstow, in the north of London.

C&A's Factory for Innovation in Textiles, or FIT, is currently testing automated stitching and laundry equipment; the first products will be in stores for Spring/Summer 2022.

PHOTO: C&A

With the evolution of machinery, including waterless finishing processes, brands of all sizes, from mass-market to boutique, are investing in their own manufacturing facilities and reviving urban or local industry. "The delivery and payment issues brands experienced during covid has turned into a reality wake-up call which, all of sudden, made reshoring a desirable trend," says Lucia Rosin. She believes that micro factories will see their day in Turkey, Pakistan and even Bangladesh in time. For Giorgio Morandin, "the creation of urban factories is a virgin market with unbelievable potential. It is a new industrial model that enhances brand value and identity, and provides new and more compelling story-telling opportunities". A sign that smaller is, at times, better.

Blue Matters, a fully-integrated green production facility in Turkey, includes a development centre and is designed for sustainable and customised denim making.

PHOTO: BLUE MATTERS

Next generation factories in focus

C&A FIT (Germany)

Staff:	100 initially, prospectively 180
Production capacity:	420,000 pairs of jeans / year
Plans:	To produce 800,000 jeans/year and expand to other products (T-shirts).
Size:	4,300 sqm

Eurotay (Serbia)

Staff:	Nearly 1,000
Production capacity:	200,000 units/month (2 million/year)
Plans:	600,000 units/month with 2,500 employees by 2025
Size:	35,000 sqm

FashionCube (France)

Staff:	Around 105
Production capacity:	2,000 pairs of jeans/day or 400,000 units/year
Plans:	To expand to 800,000 units/year
Size:	2,700 sqm

Saitex USA

Staff:	Around 230
Production capacity:	1,000 to 3,000 pairs of jeans/day
Plans:	To open micro-factories in other cities in the US and globally
Size:	4,800 sqm

Agricultural waste is a largely unused resource that could be turned into fibres for textiles, if the cellulose from the plant residues can be extracted in a cost-competitive manner. The challenge is identifying, collecting and refining crop residues into raw materials that can be made into fibres or dyestuffs.

A fresh crop of fibres

Few of us ever take a moment to think about the waste generated by the rice we eat, the orange juice we drink or the thyme we sprinkle over a dish we prepare. While the fashion industry is often criticised for the waste it generates, agriculture, and the food industry, may have an even worse track record. One solution would be to turn these unused cellulose-rich resources into new textiles.

The Laudes Foundation (formerly the C&A Foundation) took a close look at the possibility of using agricultural residues to make textile fibres in a report, "Spinning future threads", that it published in June 2021. It believes that innovation in this field "offers strong potential to decrease extensive crop burning and its associated negative environmental and climate impacts; generate new, additive low-cost revenue streams for low-income agricultural communities in South and Southeast Asia; and activate a scalable and more environmentally sustainable source of fibre for the fashion industry".

The report identifies husk and straw from rice and wheat, empty fruit bunches from oil palm, sugarcane bagasse and banana plantain waste as having potential in textiles, as either new agricultural fibres or a source of cellulose pulp for manmade cellulose fibres (MMCFs). These biomass conversion pathways do not require increasing land under cultivation or crop volumes, which the Foundation rules out.

Primark has introduced garments dyed using Archroma EarthColors, derived from agro-industry waste.

PHOTO: PRIMARK

Circular Systems' Agraloop BioFibre is currently made from oil seed flax and hemp crop waste that is refined into a textile fibre. Madewell and H&M have introduced the new natural fibre in their collections.

PHOTO: CIRCULAR SYSTEMS

New natural fibres

Not all agricultural waste can be used to make textile fibres, but a number of start-ups have identified unused cellulose-rich resources. Circular Systems, a sustainable textile start-up founded in 2017 and based in Los Angeles, has successfully developed several fibres from fibrous crop residues, such as the stalks of flax grown for its oil seed and hemp, cannabidiol (CBD) hemp, and generally all forms of industrial hemp, Isaac Nichelson, company co-founder and CEO, tells *Inside Denim*. "In North America alone, one million acres of oil seed flax is planted. This is amazing biomass that is going to waste." The company is currently making its Agraloop BioFibre from oil seed hemp grown in the Champagne region of France and flax crop waste in Belgium. It plans to launch early-stage pilot processing of banana and pineapple waste soon.

The Agraloop pre-processing phase, in which the fibre is roughly decorticated, is conducted as close to the farm as possible, then shipped to a centralised biorefinery. The company's wet processing technique uses a "bio-appropriate chemical", says Mr Nichelson, that purifies the cellulose of stems and leaves into fibre bundles that can be spun into yarns. The result is a natural fibre yarn, he says, not a MMCF, and could be labelled linen or hemp on garments.

"The yarns drawn from hemp crop waste are coarser than cotton," he says, but 30 single yarns containing 30% Agraloop BioFibre have been produced. The company has made a 100% Agraloop BioFibre fabric, "a heavy canvas for denims and bottoms," but he believes the yarn will most often be used in blends with organic or recycled cotton. Denim mills are currently testing the yarns, including Crescent Bahuman (CBL), Arvind, Artistic Milliners and Ananta Group (Bangladesh), which is also an investor in the company. Mr Nichelson expects to see denim Agraloop BioFibre fabrics on the market in 2022.

> *"In North America, 1m acres of oil seed flax is planted. This is amazing biomass"*
>
> ISAAC NICHELSON, CIRCULAR SYSTEMS

Zurich-based sustainable accessories brand Qwstion has found a new resource for textiles in a banana genus crop waste. It first identified abaca, *Musa Textilis*, in 2015 in the Philippines. With the help of a Taiwanese textile company, it developed Bananatex. To make the fabric, the fibrous raw material is first transformed into sheets of paper, then cut into fine filaments that are spun and woven into fabric, a process similar to Japanese washi fabrics.

The company is now making Bananatex available to other brands in a move to scale up production and reduce costs. "We look to partner with brands having values similar to ours," says Stephanie Walter, in charge of brand development, who says H&M used Bananatex to make sneakers. A prototype parka cut from a lighter weight fabric, weighing 250 gsm, was on display on the company's booth at Premiere Vision last month. Apparel applications are just beginning to be explored, but the fabric is not washable, as the company has yet to stabilise shrinkage, she says.

Bananatex, a fabric developed by Qwstion, is made from abaca crop waste in the Philippines and manufactured in Taiwan.

PHOTO: AQWSTION

Tree-free cellulosic fibres

MMCF producers are quick to emphasise the natural origin of their viscose, lyocell, modal or acetate, as these are made from wood. But pressure to reduce the risk of deforestation is pushing key companies to seek out alternative sources of cellulose, ideally from biomass waste.

This is exactly what Austrian MMCF producer Lenzing has achieved through its partnership with Orange Fiber. This Italian company has patented a pulp production process for citrus by-products. A first production run of four tonnes of the fibre have been produced by Lenzing, in a ratio of 80% wood pulp and 20% citrus pulp. The collaboration is part of what Lenzing is calling its Tencel Limited Edition initiative, and the company says it is open to experimentation with other biomass resources.

"Together, we have successfully incorporated an unconventional waste material with Lenzing's sustainably sourced wood to produce a new fibre, without compromising on quality or technical properties," Gert Kroner, Lenzing's vice-president for global research and development, said to *Inside Denim's* sister publication *WSA*. The concept remains a limited edition, says Florian Heubrandner, Lenzing's VP of textiles, due to the limited availability and added cost of citrus pulp compared to conventional wood pulp. Orange Fiber is overseeing sales of the new fibre, and the first fabric sample kit will be presented this October. Earlier, some will remember, Orange Fiber had presented an acetate yarn made from citrus pulp.

Many MMCF producers are investigating non-wood sources of pulp. These currently make up 7% of the world's virgin cellulose pulp, as cited in the "Spinning Future Threads" report. Birla Cellulose, an Aditya Birla Group company, is involved in several such projects. These include a research programme with Nanollose, that is developing a MMCF made from coconut waste, and a biomass research project with Fashion For Good and the Laudes Foundation. "We are looking to identify three or four possible sources of biomass, to see what applications they could have, what machinery is needed and in what blends the fibre could be used," says Mukul Agrawal, the company's head of sustainability. He insists on the importance of finding a solution that is scalable and provides yarn that can be used in all types of fabrics.

Hurd Co, a sustainable textile start-up based in Los Angeles, seeks to make cellulose pulp from hemp agricultural waste, which would be used to make lyocell or viscose fibres. Its Agrilose process is said to be zero waste and to require half the water and 350 times less energy than conventional fibre pulp. "Hemp is a high yield plant that contains a lot of cellulose," says co-founder Taylor Heisley-Cook. Still in the early stages of its development, it is seeking further funding to scale up its R&D facility.

A collaboration between Orange Fiber and Lenzing transforms citrus industry waste into a Tencel Limited Edition fibre.

PHOTO: LUCA DISTEFANO, ORANGE FIBER

Alternative biosynthetics

Other projects under way seek to use biomass resources to produce biosynthetic materials. Kintra Fibers, a start-up based in Brooklyn and Los Angeles, is working on the development of a bio-based and biodegradable polymer known as polybutylene succinate (PBS). "It is used mainly in packaging and hasn't yet been optimised for textile applications," says company co-founder and COO Alissa Baier-Lentz. She says most commercial PBS is only 50% biobased, and the first iteration of Kintra's version is 56% plant based, but its goal is to reach 100% renewable content. Like standard biosynthetics and bioplastics, the feedstock used to make Kintra fibre is sugar syrup, sucrose or glucose. The fibre in development has a cotton-like, even cashmere hand feel, she says. At lab scale, the company is producing 1kg batches. The advantage, she points out, is that once the process is optimised, the polymer will be "a direct fit for industrial extrusion and spinning". Pangaia, a company investor, will be releasing the first garments made in the fibre.

Fashion for Good has identified another biodegradable biopolymer with possible textile applications and set up a research programme known as the Renewable Carbon Textiles Project last June to investigate polyhydroxyalkanoates (PHA) polymer fibres. The consortium includes Bestseller and PVH Corp, with technological solutions provided by Bio Craft Innovation (formerly Biomize), Full Cycle Bioplastics and Newlight Technologies, and funding by the Laudes Foundation.

PHA, like PBS, is a form of polyester that is considered biodegradable; these new biosynthetic yarns would therefore not contribute to microfibre pollution, and both have been used in plastics, not textiles. Feedstocks under study in the Fashion For Good project include inedible food waste, bamboo production biomass and carbon capture. The critical stage is fibre melt-spinning, it says in the project announcement.

Advance Denim introduces BioBlue denim, which is using a green reducing agent during indigo dyeing process

without sodium hydrosulfite.

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Agro-industry dyestuffs

Fibres are not the only materials that can be drawn from agricultural waste, as Archroma has proven in its EarthColors dyestuffs, launched in 2014. These are made from an array of crop leftovers including almond shells, orange peels and rosemary leaves. "EarthColors is a journey, we are continually seeking new unused resources as alternative raw materials," says Nuria Estape, head of global marketing. The available colours are limited to those found in nature, and developing a full palette has proven to be a challenge, despite the company's efforts. Achieving bright colours is another challenge, but she says research is ongoing.

"In recent months, we've seen a change in outlook from major fashion brands," she says, noting that Primark is the latest to adopt the dyes. "It is not the first company to use EarthColors, but it is the first to use it to such an extent," she says, adding that the retailer has embraced the concept to the point of printing EarthColors branding directly on the clothes.

Colorau, a range of natural dyestuffs developed by Portuguese textile manufacturer Tintex, also uses food and wood industry waste when possible. To expand the available palette, the company also continually seeks new unused resources, "but we want to use materials that are as sustainable as possible and preferably available in our region," says Pedro Magalhães, R&D manager. Colorau includes thyme waste from a local herbal tea maker, and the chestnut and gambier are wood industry by-products sourced in Europe, he says. The company has set up a research programme with a local university to identify other possible local resources and improve extraction methods using only water as a solvent.

Tintex and Circular System have partnered to develop a series of fabrics made from Texloop recycled cotton fibre and dyed with natural Colorau dyestuffs.

PHOTO: CIRCULAR SYSTEMS

Tintex is also busy developing a patent-pending textile alternative to leather made from vegetal waste, including grape residue from vineyards in the north of Portugal. The biopolymers are combined with a water-based polyurethane and coated on a cotton substrate. "The coating can have anywhere from 10% to 30% biobased content, and with the cotton ground, we can achieve a total of 60% in the finished composite," says Mr Magalhães.

The possibilities of transforming crop waste into new materials and chemicals are far from having been fully explored, as seen in the diversity of the projects under way. Admittedly, the new fibres in development have yet to reach full commercial scale. But demand is high, and the appeal of bio- and plant-based textiles ever growing, if the success of Candiani's natural rubber stretch fibre is anything to go by. Turning leftovers from agriculture into viable industrial resources would further boost the appeal of this new crop of biofibres.

Food crops and waste

Data on global agricultural waste is difficult to come by, as organisations in this field tend to focus on food loss and waste on farms, which the WWF says is in the range of 1.2 billion tonnes, more than food gone to waste from retail, food services and households, which the UNEP pegs at 931 million tonnes (both in 2021). Estimates for non-food crop residues vary from 400 million to 1 billion tonnes, but do not cite any serious source. Farmers currently often burn the stalks, stems and stubble left after a harvest, emitting massive amounts of greenhouse gases (GHGs) that contribute to pollution and climate warming. The quantities involved do not make it feasible to compost these residues, and if they were, they would also emit potent GHGs. It would seem that this biomass could be put to better use as a source of renewable energy or materials.

Investment in new technologies and a sharp focus on R&D have contributed to Advance Denim's success, according to general manager **Amy Wang** – helping it to achieve double-digit growth for over a decade.

Advancing the green agenda

Q You started work at Advance Denim in 1993, rising to become general manager in 2009. Can you tell us about some of the main strategies or projects you have implemented since then?

A I studied textile engineering at university and joined Advance Denim after graduating. My first job in the mill was as a machine operator and maintenance worker. I worked my way up to being a technician, craftsmen, supervisor then plant manager and director of research and development. Being adept at problem solving and management as well as having a deep knowledge of technology and product development, and being able to use this experience and knowledge to increase sales, made me uniquely qualified to be promoted to general manager by the board of directors in 2009.

After becoming the general manager, I assembled a talented team to develop new products according to the requirements of different markets and customers, using innovations in fibres, dyeing and finishing. To improve the quality and production efficiency of these cutting-edge innovations, we continuously upgrade the equipment and acquire the newest technology. These efforts are recognised by our customers. Driven by continuous self-improvement and customer support, we have maintained double-digit growth every year since 2009.

We consider sustainability as a critical part of our DNA and that is why we built a world-class sewage treatment system that performs way above the national standard. In addition, we created the "GreenLet" environmental protection plan and standards. To meet this plan, we developed water- and energy-saving equipment and processes such as Bigbox and BioBlue indigo that reduce the use of water, energy and harmful chemicals as well as wastewater emissions. Recently, we promoted the establishment of the zero-carbon action plan for China's denim supply chain, this plan is earnestly implementing the goals of low-carbon production and carbon neutrality with the aim of making denim one of the most environmentally friendly fabrics, creating a cleaner industry and environment for the future generations.

What would you say are some of the advantages Advance can offer?

The first advantage is new technology. I am constantly in pursuit of the newest technological innovations and this leads to the development of many patented technologies and original products every year.

The second advantage is our understanding of the market needs and having the drive and ability to transform these concepts into actual product. Our state-of-the-art production facilities include many unique machines that enable us to satisfy our customers' desire for innovative new products.

Quality and service is also a foundational value at Advance Denim. We have adopted a three-level inspection system to control quality at every step of the production process. We also have a well-equipped laboratory that has been accredited by many renowned international brands. We have several offices around the world (Shanghai, Hong Kong, New York and Amsterdam) that are focused on customer support and product development for their respective markets. These offices ensure rapid feedback and provide customer-oriented services.

Last but not least, green production is an advantage for both our customers and the environment. In addition to selecting environmentally friendly and sustainable raw materials and practising sustainable low-carbon production, we have also joined organisations such as HIGG, BDC, ZDHC, Bluesign and many more that ensure we are as green as we can be. Advance Denim has become one of only two Green Certified mills in China, and is the only denim mill that is certified as a Printing and Dyeing Standard Enterprise. We are also one of the founding initiators of the denim zero-carbon initiative in China.

As you have built your workforce, what kind of values do you instil in your employees, and what are the main things you teach?

Our core values are environmental protection, innovation, people, quality and service. I often convey the company's vision and mission to my staff: product innovation, sustainability, consistent quality, competitive products and exceptional service. These foundational principles are to create maximum value for our customers while making denim one of the world's most environmentally friendly fabrics.

Advance has concentrated efforts and investments on improvements in dyeing, with an aniline-free dye, BigBox dye system and BioBlue Indigo. Can you explain a little about these and why it is important to improve the dye process?

It is crucial to study all stages of denim development especially the traditional dyeing chemistry, equipment and technology to make the most sustainable products possible.

Traditional indigo dye contains aniline. When we discovered that Archroma had the developed aniline-free indigo, we decided to adjust our existing dye formula and immediately introduce this cleaner, safer and more environmentally favourable indigo that achieves the same quality as traditional indigo.

Amy Wang is general manager at Advance Denim, based in Shunde in the Pearl River Delta. The company develops 500 products each year and has 35 patents, with more pending.

PHOTO: ADVANCE DENIM

"We are doing research and development on carbon reduction finishing methods and some new stretch technologies"

Bigbox uses only one very big box instead of the traditional 8-13 boxes for dyeing. Traditional indigo dyeing requires more than 10 times the padding and oxidation to let the dye penetrate deep into the yarn, but Bigbox dyeing uses inert gas, in which yarns can be dyed to the desired depth in the dye box with given time. The machine is also equipped with a device that can control the penetration of indigo dye into the yarn, so that you can get different levels of white core in the yarn. The Bigbox dyeing is certified by third party audit and can save up to 93% of water, 45% of energy as well as 25% of chemicals compared with a traditional dyeing machine.

BioBlue is another breakthrough and is our ability to dye indigo without the use of sodium hydrosulfite. Sodium hydrosulfite has been the traditional way to make indigo soluble in water, but it is a harsh chemical that has adverse impacts on the environment and is also dangerously flammable. In looking at new ways to replace sodium hydrosulfite, we investigated a method that used electricity to aid in the indigo reduction but found the cost of machinery very high and the productivity was low. Looking further into the potential of using electricity, the machines not only took up too much space but used the equivalent power of 9 dyeing ranges just to run the machine, the carbon emissions very high as a result. BioBlue is a specially designed technology that detects and adjusts the technical parameters in the entire production process to completely replace sodium hydrosulfite. The effluent from indigo reduced with the BioBlue indigo dyeing system has 70% lower COD [chemical oxygen demand] and 55% lower BOD [biological oxygen demand] values compared with sodium hydrosulfite. BioBlue is also free of all banned chemicals and APEO (alkylphenol ethoxylates).

Is it easy or difficult to persuade customers to choose a product with a higher price but with better sustainability?

I think the increased demand for sustainable products is a global trend and we should be aware of the negative impact of the fashion industry on the environment over the years. The fashion industry is responsible for 10% of all carbon emissions. The governments of various countries around the world understand the importance of protecting the environment and sustainable development.

Many major international brands have set sustainable development goals and have pushed for implementation in their supply chain to achieve these goals. Some brands understand that costs have increased and will pay the rational increase because they have the DNA of pursuing sustainability and have done a lot of research and have encouraged their suppliers to invest in sustainable innovations.

I believe that as consumers and governments demand environmental and sustainable innovation, brands that do not pay for sustainability will find it difficult to adapt to future development and will be abandoned by consumers. I believe that more and more brands will pay attention to it.

Advance has set a goal that by 2023, 90% of raw materials will be 'environmentally friendly' – why was this target set and how close are you to achieving it? Which raw materials are the most difficult to make or replace with 'eco' versions?

Advance Denim has a long-term sustainable development plan. As early as 2010, we launched the "GreenLet" environmental protection project that created sustainable process and standards.

Green products first require green materials. According to a research report by McKinsey & Company, in the entire clothing production process, about 38% of carbon emissions come from the production of materials. To reduce the environmental impact, we must first start with the raw materials. Therefore, five years ago, we set the target of using more green fibres every year with the goal of using 90% of our fibres from green sustainable sources by 2023. Now we have significant partners and brands that insist on sustainable fibres such as Tencel, organic cotton, recycled polyester, recycled cotton, hemp, biodegradable polyester, nylon, etc, in their major programmes. We believe that our goals will be achieved on schedule.

I think the most difficult raw material to convert to an eco fibre is spandex. It is difficult to maintain the elasticity and resilience of spandex in a degradable form. There are also issues of whether or not the degraded polyester is truly environmentally friendly or will just increase micro polyester pollution.

There has been some global political turmoil in recent years, including problems with trade relations, and with cotton sourcing (not to mention the pandemic!). How has Advance Denim worked around any issues?

I think that the political turmoil, including trade relations, global cotton sourcing and of course the pandemic are all part of the macro environment. We feel helpless about the impact of macro trends on the entire fashion industry. Having said that, we are still doing our best and proactively co-operating with our customers to fulfil their needs as best we can. In the ever-shifting global cotton sourcing challenges, we have joined some third-party verification platforms to ensure the traceability and transparency as to the origin of our cotton.

In addition to China, we also have a production facility in Vietnam. Our Vietnam facility can work closely with our customers growing supply chains in both Vietnam and surrounding countries as well as take advantage of free trade agreements with various countries (EU, Japan, etc)

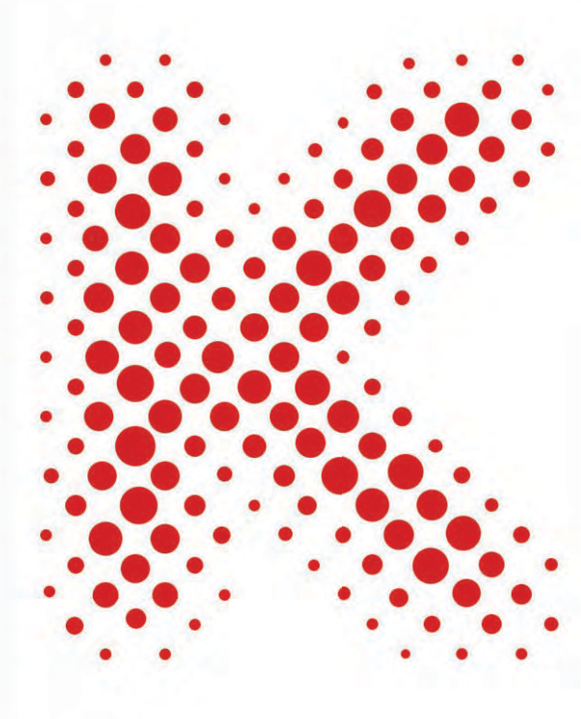
What's Advance's attitude towards R&D and is there anything that you are working on that you can tell us about, in terms of what will be important in the future?

Our attitude is to keep going with our tireless research and development efforts. We will continue to overcome difficulties, focus and concentrate, be professional and keep investing in cutting-edge equipment and technology as well as attracting the most talented people.

In terms of what we are working on, we are now doing research and development on carbon reduction finishing methods and some new stretch technologies, such as bare Lycra. Some projects are very large and capital intensive and some are relatively small but they all have the same importance.

How do you switch off from work and relax?

I like walking, talking with my husband and parents as well as listening to music. All are very relaxing. I have four kittens and I enjoy feeding them, taking care of them and watching them play and that relaxes me as well. I also find relaxation in cooking for my family and friends. There are many ways to relax, but I believe that I have merged my work into my life. I don't find work very tiring, but endlessly exciting and interesting.



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PVH Corp. in the US has set bold targets for waste, fabrics, water and chemicals. Nicolas Prophte, a driving force for change in Tommy Hilfiger's denim ranges, tells us that as well as lowering the impact on environment and workers, it seeks to scale its learnings across the industry.

Driving change together

2020 was a year like no other in recent history, says PVH CEO Stefan Larsson in the introduction to the clothing group's latest corporate responsibility report. While the owner of Tommy Hilfiger and Calvin Klein – and indeed the world – was focused on navigating the covid-19 pandemic, it also continued to make progress on its commitments "with a renewed sense of urgency".

Goals set within the report include recycled materials, water usage, reducing chemicals and energy, improving worker safety, ethical sourcing and diversity. Through its Forward Fashion strategy, the group aims to "reduce negative impacts to zero, increase positive impacts to 100% and improve the estimated 1 million lives throughout the value chain" (associates and supply chain workers, their families and communities). By 2030, it expects a 30% reduction in supply chain emissions; renewable energy-driven offices, warehouse and stores, with zero waste and no single-use plastics; and 100% of suppliers meeting or exceeding its social and environmental standards.

Recycling forerunner

Part of these targets will be met by transforming denim, with Nicolas Prophte, vice-president of sourcing, production and innovation in denim for Tommy Hilfiger, and his team at the helm. They are nudging suppliers towards more environmental ways of producing, and designing product that has more "responsible" fibre as well as end-of-life solutions in mind.

As of last year, half of all denim pieces used lower-impact manufacturing in finishes. By 2025, half of all Tommy Hilfiger denim pieces will use lower-impact fabrics.

PHOTO: TOMMY HILFIGER

Tommy Jeans has been one of the forerunners on using recycled cotton for the past few seasons, launching a 100% recycled jean – 80% pre-consumer and 20% post-consumer recycled cotton fibre (POCR) – as early as Spring/Summer 19, in collaboration with Turkish mill Kipas. It has also scaled up the use of POCR to a minimum of 20%, and this is now standard across its denim collections.

Mr Prophte tells us that, supported by strong relationships with mill partners, the group has achieved its initial targets faster than anticipated and, as of this autumn, 2.3 million pieces of denim contain a minimum of 20% POCR. "This means that we are already close to achieving our goal of 3 million pieces by 2025," he says. "In just two years, we've achieved this standard in 75-80% of all our fabrics, and we believe this could soon reach the 90% ratio."

Part of this success was due to using the latest spinning techniques and mills using more of their own waste, but securing high quality POCR waste streams has also been vital. "The main challenge is not technical, but to do with securing post-consumer waste textiles to feed the recycling lines," he says, of why these things take time to increase. "We must continue to engage with new stakeholders to ensure that that we're able to collect and sort textile waste in an efficient way that can be scaled up."

In October 2020, PVH launched its first circular business model, Tommy for Life, in The Netherlands. In partnership with The Renewal Workshop, the company sorts and repairs items collected via customer takeback and damaged products from retail stores and e-commerce. Items that cannot be restored are reinvented into unique styles as part of the Remixed collections. Those that cannot be used are recycled into yarns or repurposed, for instance into insulation, or donated via Tommy's philanthropic arm, Tommy Cares. Following its successful expansion into France in May, the project will be expanded into Denmark and Germany this autumn.

Laundry targets

As part of the CR report, PVH pledged all water leaving wet processors (mills, dye houses, laundries) will have zero hazardous chemicals and be filtered for harmful microfibres by 2025. Many of these suppliers have submitted Higg Facility Environmental Module data and are setting targets to improve water usage. For denim, the group's Low Impact Washes (LIW) programme has been measuring and comparing metrics from laundries for a number of years, helping to benchmark and reduce impacts. Laundries' recent big investments have focused on recycling water systems, renewable energy, laser and ozone technologies as well "smart chemistry" to reduce the impact on water resources, greenhouse gas emissions, energy consumption and improve worker conditions.

> *"The main challenge is not technical, but to do with securing post-consumer waste textiles"*
>
> NICOLAS PROPHTE, TOMMY HILFIGER

"We also have a role to play in driving change, and our PVH Product Innovation Lab [in Amsterdam] is a means towards this," explains Mr Prophte. "It also requires us to collaborate with technology providers or chemical groups to pilot and scale innovation with our laundry partners."

Digital push

As with every organisation around the world, 2020 brought a fresh set of challenges, with stores and factories closed, supplies halted and sales plummeting. PVH changed several of its plans and business practices and, at times, had to "make difficult decisions to balance interests and needs".

Mr Prophte says in many ways the pandemic accelerated industry changes that were already under way. "As with the rest of the world, we shifted our work from physical to digital engagement and found new ways to interact with our mills, vendors and even reach people and partners we never reached before." Previously in-person bi-annual PVH Europe Denim Fairs went digital, allowing access to participants who previously may not have had the opportunity.

As a group, PVH helped create International Labour Association's Call to Action, supported by more than 120 organisations, focusing on protecting garment workers' income, ensuring goods are paid for and establishing long-term systems of social protection.

Industry alignment

This kind of industry collaboration is key and "competitiveness should not be a reason not to partner on such initiatives". In the past year, PVH has signed the United Nations Global Compact's Business Ambition for 1.5°C Commitment letter, recognising the need for multilateral partnership in finding climate solutions; and joined Fashion for Good's Full Circle Textiles project, testing textile-to-textile chemical recycling with Evrnu, Infinited Fiber Company, PhoenixT, Re:Newcell and Tyton BioSciences.

Last October, PVH Europe joined the Dutch government's Denim Deal, serving on the steering committee to help make recycling fibre the "new norm" through collectively setting up a "reverse supply chain" for recycled cotton. It was also one of the early signatories of Ellen MacArthur's Jeans Redesign initiative, with the first products made to the guidelines launched in March.

"Partnerships, like the ones we have with the Ellen MacArthur Foundation and the Dutch Denim Deal, allow us to share learnings, insights and findings with industry partners," says Mr Prophte. "Rather than approaching challenges alone, these partnerships help us align industry resources to find the best solution possible, allowing us to meet commercial needs and scale faster than ever before."

The group was also noted among leaders in the Textile Exchanges' Material Change Leaderboard 2020, alongside denim brands such as Mud Jeans and Nudie Jeans, for demonstrating "exceptional progress in preferred materials and actioning circularity agendas". Inclusion in voluntary assessments such as these set the tone for accountability. "The denim industry must continue to lead on key issues like sustainability by aligning on concrete actions and clear commitments in their production processes, and by adopting the same measurement tools to enable cross-industry benchmarking and roadmap building," adds Mr Prophte. "Real, impactful, change can only be achieved if industry partners come together to collaborate, share ideas and commit to driving change, together."

Designers and consultants **Malin Ekengren, Miles Johnson** and **Sue Barrett** have been friends for many years. They discuss how the industry is changing, how the pandemic has shifted the goalposts and how they'd like to see things develop in the future.

Shining the light

Inside Denim: Shall we start with exploring what is special about the denim community?

Sue Barrett: We all worked in Brussels and I think the uniqueness of that, the close-knit aspect, is something I've always experienced and it took me a while to realise that that was unique to the denim industry as opposed to the fashion industry. I came from a trend forecasting house in London where one of my clients was Harvey Nichols, and it was all about black suits and very official. Then I moved into the denim industry and the more laid back you are and the more dishevelled you look, the cooler you are, and I thought, well, I have arrived! There's just something so welcoming and soulful about the denim industry. In lockdown, there's been a WhatsApp group of London denim designers that have pinged messages of support and talked about innovations.

Miles Johnson: How much of that is because denim is worn by most people, the industry is a reflection of that, so it has to maybe be a bit more friendly?

SB: I think it's also because there's a collaborative spirit, you're talking about passion and the alchemy of the process and I don't think that happens in a fashion arena in the same way. On the retail floor they have really tight deadlines and it's a very different energy, whereas with denim you're exploring a process and it's a different perspective.

Malin Ekengren: How do you think the UK industry compares with other countries'? We obviously cross paths with people globally, especially now, with us doing a lot of work online.

SB: I would imagine that in Italy it's very similar to the UK but I guess it depends on what side of the industry you're on.

MJ: I like to think that we are a little bit ahead in the UK but with the pandemic it's difficult to see what's happening, because we're not obsessed by retail anymore, it's just necessity. Malin, I wanted to ask about the impacts of the denim and clothing industry on the environment and what can be done possibly to balance out some of those impacts?

ME: I think transparency is key as well as respecting nature and natural resources. The whole supply chain needs to be simplified. We need to educate people about how the process works, be ethical, and everyone needs to know who makes the denim and how jeans are made. We need to rebalance the way that we create product because it's not only about using organic cotton or recycled content; it's also about workers' rights, the supply chain on a whole and how you can trace the product. We should also be working towards reducing fossil fuel usage in everyday life. I don't think people are aware how oil-derived products are used in denim in different

Now or Never, Miles' hemp-centred denim collection made with Crescent Bahuman.

PHOTO: CRESCENT BAHUMAN

ways. It urgently needs to be addressed because denim production also uses up a lot of natural resources. The pandemic has shown we need to speed up this process and progress faster to working in a different way and think more circular. Make better and make less.

MJ: I think words like circularity and regenerative are all part of the same thing and designing product now is not just about selling and making money, this is about doing something which is low impact and we have to be able to design product which is designed for disassembly and is easy to recycle at the end of its life.

One of the reasons I think we all love denim so much is because of the ageing process. The garment is designed to age and should look better the older it gets – if you really value the authenticity of it as a product you should be able to wear it for the rest of your life and hand it onto someone else, but eventually it does have to pulled apart to be recycled. There should be investment put in place so that recycling product is easier than it is at the moment.

ME: We really need to work on the whole process, make everything clearer, cleaner and simplified. As designers we need to create product with a longer life cycle, using less polyester and less chemicals.

MJ: I think people are going to have to start spending more money on their product and we're going have to stop giving so much choice for cheaper options that aren't sustainable. Most designers and buyers are fully aware of the need to put sustainable product into the market but if the company's bottom line is making money and it's not about trying to protect and conserve the planet, then unfortunately they're in a really tricky situation where they have to make tough decisions on how to do both.

There's a lot of pressure on designers and buyers to be able to achieve this and tick all those boxes. I don't have the answers necessarily because every company seems to work differently and everyone's understanding of what sustainability is is different.

ME: Yes, and there's so many different parts of it and it's so difficult to pick one piece of that huge pie. We need to work on the whole picture.

MJ: It's a bit like how we used to work on some of those really exciting denim projects back in the day when you take every single component and process apart mentally and you look at how things can be improved. That puts a lot of responsibility into our hands to find ways to make improvements. The companies aren't going to come along and start telling their workforce how to do things better, they are heavily relying on people finding ways to make improvements without spending more money as the customer doesn't want to spend more money on the product. But actually, the customer will need to start spending more money as the prices haven't really gone up very much since the 80s.

SB: We are quite lucky in that we entered the denim industry through the portal of iconic brands and what we experienced from that was a connection to denim but also the narrative behind brands and products and the importance of products as they age. I think if we'd entered the market through a completely different portal of denim, what we experienced might be just cost.

The speed of growth of the denim industry means the values haven't really stayed within a large chunk of the market so all of that "doing the right thing, making denim great" just wasn't on the agenda. Denim becoming a fashion item really changed the sensitivity by which people handled it and I wonder if a reduction in in sales and SKUs [stock-keeping unit] will start to bring back the tipping point and will start to bring back those values of creating things better. If prices go back up that will reinvigorate people's interest in prolonging the garments.

What's amazing to see is the rise of vintage within the youth market; it's a really key tipping point and is flooded with young entrepreneurs wanting to sell and buy on Depop. And wanting to find those treasures. What's key for them are the brands that developed quality, long lasting product.

MJ: It does feel a little bit like that, the whole thing of the hunt. Remember how we used to feel like that about the best vintage items?

ME: It's all happening online instead!

MJ: Yes, something that has been knocking around for 20-30 years suddenly looks really exciting to an 18-year-old. That's brilliant that they've got that accessibility to it. We used to fly around the world, to the Rose Bowl [Los Angeles] and places, but now they can do it online in the middle of a pandemic.

SB: I was doing a project with Ravensbourne and some of the students asked 'how should we be doing this and how should we be responding to this?' I said you have reached a point in time where the rules have flatlined and the way that people have been making things for the last 20 years is under scrutiny. When we joined the industry there was an element of needing to listen to your elders, whereas I feel it's those kids that need to ask the awkward questions and be slightly more demanding to actually bring in the innovation.

ME: On that, what are the opportunities for the next generation?

SB: The big one at the moment is to be a 3D designer. There is so much talk about non-fungible tokens, about digital art, but the energy that is required to support all of those functions is now under question, so I think it's going to go back to the luddites and everything will be hand drawn and made into a lovely book with swatches attached and sent through the post! Can you imagine.

Sue helps companies understand the relevance of trend foresight and innovation to position their business for growth.

PHOTO: SUE BARRETT

MJ: Things aren't very tactile, are they, these days, it's all very digital. I press a button, it's made and on my desk in less than a week and it's just a bit cold. Going back to denim in particular, it is textiles so it's about how it feels and how it looks. We are heading towards this very robotic way of designing but actually I hope we never take our hands out of it.

SB: Exactly. Textiles are the things that you surround yourself with in your home, they are the products that you love that you create your nest around.

MJ: Yes, it's emotional. That's the other thing about denim, it has an emotional side to it. We all have product that when we put it on it makes us feel a certain way.

ME: What do you think is the future then for young designers or people coming into the denim industry?

SB: I would say it's a time to go maverick and a time to be challenging. There are lots of companies that will just want people to do a particular job that might be quite pedestrian but actually what the climate really needs is mavericks that will stand out and break down the paradigms.

MJ: Sometimes it's easier when you are a young designer to see where something doesn't work, whereas when people have been in it for a long time they think about how things have traditionally been done.

MJ: If you wanted to get into the denim industry, is there an area that might be easier to focus on?

SB: I've observed the pressure on students nowadays compared to when I was at college, they have to be so brilliant on all different levels: the way they present themselves, brilliant digitally, to understand the flow charts and circularity, the manufacturing structures. There are so many more elements that they have to know and there's a huge amount of pressure.

MJ: Malin, how do you think that the pandemic has affected things, do you think that maybe there's some learning coming out of this?

ME: The most obvious was not travelling that we probably all missed. That really affected the way I work, not meeting people or sourcing fabrics IRL. I think business travel will definitely come back because working online can never really replace sharing ideas face to face, in real life. Even before this happened, I always preferred having meetings with mills and other people in a smaller setting. Personal contact is really important and it makes work more efficient. But I can't wait to travel and see fabric and meet people.

One positive thing was the super quick change to creating amazing online content and platforms. Our industry really came together and quickly adapted. One other great thing for me was having to find creative resources locally, whether it was vintage shops by appointment or having to do research at a friend's Vogue library or even my own library, so using your creativity in a different way.

MJ: You go to fairs to look at fabrics but then we bump into everybody, you have conversations and a few laughs and you actually talk about the industry and where things are heading. You get so much information from those little sideline conversations that we've been missing. The denim industry was under so much scrutiny a while back as being very environmentally damaging and so a lot of people have been working together on making massive seismic changes. That can only really come from having those kind of kickback conversations. The three of us talk and share ideas, and if that information gets spread to other people, we are maybe becoming the elders that are shining the light.

ME: Another thing with travel and fairs being cancelled was you became very creative with what you had. Using my image library, stock fabrics and my own vintage archive – you can be creative with little.

MJ: Restriction is one of the things that makes creative people even more creative. You also take more responsibility for stuff that's already in stock rooms or warehouses, mend and make do. Sometimes that can force you to make some really great product. How useful was having really good relationships with industry friends?

ME: Reaching out to industry contacts became very positive and not only a work lifeline but also keeping in touch on a personal level.

MJ: I've been doing the most amazing amount of work on WhatsApp. Sending messages to people I've known for years saying, 'Can you make me a fabric with these fibres in? You know what I like'.

ME: Yes, some simple ways of working will be here to stay. You would be sent a book of fabric swatches and that's quite an efficient and tactile way of working.

Looking at small wash labs that might be setting up in London, or the idea of small factories here, how useful would that be?

ME: I have been to see some of the new London set-ups and I definitely look forward to seeing what we can do locally. That's going back to what I said before about using local resources – it would also be a really great way of working efficiently. I think it's quite exciting for the industry and it will be amazing for students to see first hand how things are made.

Malin's co-lab for London brand Ssone used excess and waste fabrics.

PHOTO: SSONE

SB: I was always blown away by the brands that had those at innovation hubs and it's really nice that something similar is happening in London. People have always come to London as a destination so it's great that that is being met with innovation where we can create stuff. I think it's very exciting and puts London on the map in a different way. It's the perfect partnership where people come here to really pick up the energy and then translate it locally. And who doesn't want to go to London!

Wealth of experience

Sue Barrett is an accomplished creative strategist and future trends specialist. With over 20 years' experience in denim, brand positioning and trend forecasting, her expertise influences some of the world's most renowned brands and industry insiders. She is passionate about bringing the voices from the street into the corporate mix and focusing them into a relevant commercial tool that drives innovation and business development.

Miles Johnson is a responsible and environmental design specialist and an established speaker on ethical practices in clothing design and in healthier manufacturing. He worked alongside Orta and Denim Village for two years on trends and finish directions. Previous roles include creative director of product design and development at outdoor brand Patagonia and creative director at Levi Strauss XX.

Malin Ekengren is a denim consultant with over 15 years' expertise in the industry. Her London-based denim studio and archive has worked with some of the world's most well-known denim brands and premium labels. Malin takes inspiration from her vintage archive and future denim trends. Malin Denim studio offers bespoke design, fabric and trend services to premium and independent brands focusing on sustainable denim.

A community project in the north of England that aims to grow and process flax through to dyed, finished linen could result in very exclusive jeans. It could also inspire a wider revival of textile and clothing manufacturing at a local level.

No place like home

Clothing entrepreneur, designer and television personality Patrick Grant is backing a community textile project in Blackburn that aims to prove that locally made apparel from locally grown textiles and natural dyestuff is still possible in the UK in 2021. Homegrown Homespun is a regenerative fashion project that has grown out of a wider arts programme in this part of northern England called Super Slow Way. In spring 2021, with the support of Patrick Grant, volunteers cleared an area of land and began growing flax on it, leaving space for woad and other plants that can provide natural dyes.

Hardy volunteers have gone every Friday since then, in sunshine and in rain, to look after the plot, which was donated to the project by the local council. The land, situated close to a wooded area near the Leeds-Liverpool canal, was disused and overgrown, but the Homegrown Homespun team cleared it, fenced it off neatly (with the help of students from Blackburn College), tilled, drilled, seeded and weeded it until, in the middle of August, the flax was ready for pulling, retting, spinning and weaving. Volunteers have included people of all ages from all parts of the region and the project, from the outset, has been open to everyone. It is close to Blackburn railway station and one of the Super Slow Way directors, Jenny Rutter, says there are plans to cut walkways between the flax field and the Leeds-Liverpool canal, which would allow local runners, walkers and cyclists to make a very quick detour from the towpath to see the site.

Cut and dried. The project's aim goes beyond one crop of flax and one pair of linen jeans to a revival of locally produced fibre, fabric and clothing in Lancashire.

PHOTO: JUSTINE ALDERSLEY-WILLIAMS

Northern stories

Super Slow Way takes its name from the canal; Yorkshire poet Ian McMillan gave it this title in a short poem from 2016, which he wrote to commemorate the 200th anniversary of the canal's completion. He talks about the waterway as a conduit for "our tales, our Northern stories". The programme focuses on the communities that grew up beside the canal, or at least the stretch of it that spans the 25 kilometres or so between Pendle and Blackburn.

Jenny Rutter immediately loved the idea of featuring textiles and clothing produced by local communities. "There used to be 100,000 looms in Burnley [one of the towns in her area] alone," she explains. "Manchester was the showcase for clothes and fabrics, but all the spinning and weaving happened here. The climate is suited to it because it's damp here, making fires in the mills less likely. That's also why people wore wooden clogs in the mills; boots with hobnails could spark and cause fires. All of these things, the mills, the cloth and the clogs, are part of our local heritage."

Super Slow Way's aim is to use arts and culture projects to help people stay connected to the whole of that heritage, including textiles. "The textile industry is here because the canal is here and our communities are as diverse as they are thanks to the textile industry," Ms Rutter says.

Local sourcing

No irrigation was required to produce Homegrown Homespun's special crop in this rainy part of the world and the team used no fertiliser either. North West England Fibreshed, another of the driving forces behind the project, would have wanted the field to fill with flax in no other way. A community of textile producers and educators who champion regeneratively grown materials, Fibreshed is a non-profit organisation that launched in California in 2010. Founder, Rebecca Burgess, set out to develop, for her own use, a wardrobe of garments whose fibres, dyes and labour were sourced entirely from her home region. She explained that she wanted to reduce her ecological footprint, so she teamed up with farmers and artisans who were no more than 250 kilometres from her home in Fairfax, to the north of San Francisco, to source clothing in a super slow way.

Clothing entrepreneur and television personality Patrick Grant at the Homegrown Homespun field in the early days of the project in spring 2021. He wants consumers to be able to choose climate-positive materials for their clothes.

PHOTO: BEA DAVIDSON

First project

Her idea has spread and there are now Fibreshed communities across the US and Canada, as well as in Denmark, Finland, Germany and India. There are four in the United Kingdom, including the North West England Fibreshed, set up by Wirral-based textile dyeing specialist Justine Aldersey-Williams in 2020. Homegrown Homespun is this Fibreshed community's first project, with Ms Aldersey-Williams organising workshops from the outset to help local people increase their knowledge of fibres, spinning, weaving and dyeing. At the time of a *Inside Denim* visit, one wet summer Friday, this included an impromptu demonstration of the effects of woad on a small, white, silk handkerchief. There is a dye garden just in front of the flax field with, in addition to woad, marigolds for yellow dye, hollyhocks for purple, madder and lady's bedstraw for red.

For the purposes of the demonstration, she picked woad leaves from the plot and placed them in a metal salad bowl. She then worked the leaves with her hand for a time, almost as though she were kneading dough for bread, before adding the handkerchief to the mix. It quickly turned green, but the colour would soon change to blue, with exposure to oxygen.

Justine Aldersey-Williams and Patrick Grant together came up with this initiative. She knew him to be as passionate about locally sourced and produced clothes as she is and, because he is a judge on a BBC television programme that showcases and celebrates the sewing skills of members of the public, his involvement has helped attract wider interest.

Community concerns

Mr Grant's own business interests include high-end, London-based tailoring and menswear brands Norton & Sons and E. Tautz & Sons. In recent years, he has also taken over the Cookson & Clegg Clothing Company, which makes jeans at a factory in Blackburn, and set up a social enterprise called Community Clothing, which is also based in the Lancashire city. It aims to produce UK-made clothing and to connect with communities in which clothing and textiles play, or have played, a significant role. With Community Clothing, Mr Grant, who lives near Blackburn, aims to design and make "simple ranges of clothing for men and women" using the fruits of these communities' labour.

Another motivation for Community Clothing is to highlight the state of play that has emerged on UK high streets (and elsewhere). "The market price for clothing has fallen dramatically in the last two decades," Mr Grant said on setting up Community Clothing, "as a result of retailers moving their manufacturing offshore." But he said the same retailers, driven by shareholders' desire for profit, continue to demand high margins, and the prices they charge consumers reflect this. Garments from UK-based manufacturers would command even higher prices, but not high enough to make most of these businesses viable owing to the small volumes retailers want to stock. All that is left to these local manufacturers, according to him, is "smaller-volume, seasonal production for the higher-end fashion industry". In most cases, this is work for specific times of the year only, leading to a lot of what he calls "seasonal hiring and firing" of garment workers. In some cases, people are even being paid "wages below the legal minimum", he claims. His idea is to have skilled workers make Community Clothing's collections during otherwise "quiet production periods"; Mr Grant's community interest company will sell these clothes directly to the public. "We can keep prices affordable and sell large volumes," he says.

Turn the clock back

Speaking on the same theme on BBC Radio in June, Patrick Grant said: "The textile system we have now, as lots of us know, is pretty damaging to the environment. We want to turn the clock back to a system that existed a few hundred years ago when everything was produced locally and people in the community got involved."

All of this helps explain his involvement in Homegrown Homespun. He describes flax as "an amazing plant that just springs to life" (in the right geographies). His specific aim is to use the locally grown linen fibres from the project to make, through Community Clothing, some jeans. What he makes will then go on show at an exhibition called the British Textile Biennial this autumn. "We want to prove the concept," Mr Grant says, "and if the concept works we'll roll it out in a bigger way. We want to regenerate sustainable clothing and to create jobs. We want to encourage people to move away from having bad materials in their clothes to using good, climate-positive materials instead."

This chimes completely with the views of Justine Aldersey-Williams. "It's simple," she says. "We have to choose between clothing from above the ground and clothing from below the ground." This same thought is part of her manifesto for North West England Fibreshed, in which she calls for a transition from extractive textile manufacturing processes to more regenerative systems. Anything that moves us away from fossil fuels is positive in her book, even if it is only in a (super) slow way. She's not aiming to end greenwashing in the global fashion industry, saying with a shrug: "I don't think greenwashing will ever stop. People who tell lies will keep telling lies. Nothing will change them. For some of us, though, there is a better way. We can live with less and make things that last longer."

Justine Aldersey-Williams demonstrates hand-dyeing with woad to volunteers at the Homegrown Homespun project in Blackburn.

PHOTO: WTP

Start small

Homegrown Homespun's initial ambitions are deliberately conservative and the team will be happy even with just one pair of Patrick Grant jeans from this inaugural crop. "We calculated conservatively because we wondered about crop failure and other factors," Ms Aldersey-Williams says, "but we will have more than enough. The flax you can grow in 15 square-metres of land will give enough linen to make one pair of jeans. We have 300 or 400 square-metres here." The whole point is to make a start and show that the Homegrown Homespun idea can bear fruit. "Starting with a single pair of jeans, she explains, "we will build a whole network of people who will grow flax in their gardens, their allotments or fields like this one. We will have people who can process the fibres, make spun yarn and weave fabric. These crafts have not been valued or taken seriously because they were women's work. That needs to change. These are activities that connect us to the earth."

If the project team is able to expand Homegrown Homespun, what it envisages is something that could emulate the way Harris Tweed works in Scotland. Harris Tweed is woven from 100% pure new wool yarn that must, by law, have been dyed and spun in the Outer Hebrides, the most remote of the inhabited isles off the west coast of Scotland. The yarn must be woven by hand in the homes of islanders. At the moment, there are 220 weavers throughout the islands collectively producing between 1 million and 1.5 million metres of Harris Tweed fabric per year. These people often have other jobs, too, such as looking after land and livestock, but weaving a fabric that is in great demand the world over provides an important supplementary income throughout the year.

Justine Aldersey-Williams, Jenny Rutter and Patrick Grant believe that something similar could flourish in Lancashire as a result of Homegrown Homespun, with a real flax, linen and clothing cottage-industry building up there. It will not challenge fast fashion, but it will show that a slower, alternative way is possible.

insideDenim
BEHIND THE SEAMS OF THE GLOBAL DENIM INDUSTRY

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3,000+

We're growing!

It's been 18 months since we published our first issue and despite the pandemic we are growing and growing fast! We are so pleased so many of you are subscribing to and liking our content. Amongst the challenges there's further positives as we connect with industry professionals quite literally all over the world. In less than a year we have over 3,000 registered website users and an organic 4,500 following across our social media channels, we're hearing loud and clear that our 'science behind the seams' approach to reporting on the industry is welcome and appreciated. We've so much more to come!

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Cotton won't lose its crown anytime soon – particularly when it comes to denim manufacturing. As *Inside Denim* finds out, opportunities abound for getting things right in Africa.

Hot commodity

Africa is home to 54 countries, including 48 on the mainland and six island nations. When several of the world's top denim-producing countries (think Bangladesh, Pakistan and Vietnam) also happen to be some of the most significant consumers of African cotton fibre – according to Paige Earlam, head of group marketing at Liverpool-headquartered trader and producer Plexus Cotton, that is – it perhaps becomes even more necessary to cultivate a deeper appreciation for the continent's current role in the global cotton trade.

Marco Bänninger, head trader for hand-picked cotton at Swiss trader Reinhart and a member of the Cotton made in Africa (CmiA) advisory board, was kind enough to break down the differences between African cotton for *Inside Denim*. "There are indeed larger and smaller differences in quality among the various producing origins within Africa," he says. Highlighting the role of individual spinning mills' preferences in the selection process, Mr Bänninger for the most part attributes any major variations to the ginning processes in different regions. In West Africa, he says, cotton is almost exclusively ginned by saw ginning, whereas roller ginning is more common in East Africa.

While acknowledging the inherent difficulties with making any manner of generalisation ("quite different qualities are produced even within one country," he states), Mr Bänninger says that, on the whole, West Africa tends to produce better (ie, longer) staple lengths than its eastern counterpart, which he puts down to these geographical variations in cotton ginning. On price, he points to the quality advantages of the cotton produced in Cameroon, for example, in addition to certain grades from Burkina Faso, as a key reason behind different (largely western) African countries' higher price points for their fibre. These so-described quality advantages are mainly due to the better grading and longer staple lengths of the cotton produced in parts of West Africa, he says.

Plexus has regularly collaborated with fashion design students from Liverpool John Moores University over the years, acting as both a catalyst and a competition sponsor for the making of garments inspired by its traceable cotton initiatives in Africa.

ALL PHOTOS: PLEXUS COTTON

Mrs Earlam emphasises that each African country has its own unique selling point. “You must appreciate that soil, weather patterns and how groups of farmers are set up – plus government guidelines and priorities – are different in each country,” she notes, adding how Plexus works with farmers and governments to find “the best way forward” for each of them, on a case by case basis. Opportunities do exist for doing things differently, she elaborates. Herself a founding member of the Fashion Council Uganda, established in 2019, Mrs Earlam is particularly well-versed in this.

Navigating (and nurturing) regeneration

Now headed up by a board of directors with designer Bobby Kolade (born in Sudan to German-Nigerian parents, but raised in Uganda prior to periods of work in Berlin and Paris) at the helm, Mrs Earlam says it was always her intention to leave the nascent fashion council once it was up and running (she left in September 2020). The original idea was to use Plexus’ and her own connections to bring a Ugandan fashion council to life, through forging new and expanding existing professional networks to help local designers at the beginning of their careers. She especially lists the involvement of the London-based Commonwealth Fashion Council, Mr Kolade and other designers including Gloria Wavamunno – the English-born, London- and Kampala-raised founder of Kampala fashion week – as key sources of support in helping this vision become a reality.

This focus on fruitful, in-country partnerships meshes well with Plexus’ commitment to regenerative agriculture as a company. “We are very much about using various systems to look after the soil,” she reveals, also emphasising that, to date, the group grows its cotton in nations which do not permit the cultivation of genetically modified organisms (GMOs) and encourages the use of rainwater for growing crops. Plexus is also currently in the process of expanding its organic production. Aiming to progress further down this route through farmer education, she details several on-the-ground Plexus initiatives designed to show local farmers how to adopt natural remedies for pest control, as well as train those newer to the profession in organic production.

This includes setting up chilli production sites (the resulting peri-peri sauce can be used as a natural insecticide) and the introduction of Plexus’ Planter concept, which enables smallholders to leave their mulch and plant new seeds with minimal disruption to the soil at the appropriate depth, meaning end-of-season crops are less likely to be burned. The company works with the Netherlands’ SNV development organisation, among other enterprises, to train young people in farming practices (SNV’s goal is to upskill 2,000 young farmers) and help them to develop life skills, generally. “All our partners are committed to education,” she underlines. “The development and changes we wish to bring in all take time and investment, so it is an evolving process.”

Denim for Africa, by Africa

Whereas most African denim-making takes place in Kenya, Egypt, Mauritius, Morocco and South Africa, these export-focused articles are very much geared towards the climates of the Northern Hemisphere, Mrs Earlam explains. In Uganda, for instance, some designers do upcycle second-hand denim with prints and embroidery, but these ‘pre-loved’ garments were originally intended for the cooler temperatures found in the global north, so are somewhat lacking in terms of providing a ‘perfect fit’ for locals. Perhaps because of this, the country has yet to witness the wearing

Cotton ginners working at a facility in Mozambique, where Plexus subsidiary Plexus Mozambique is considered to be the East African nation's largest cotton producer, counting a base of roughly 165,000 farmers.

or production of denim on a mass scale, she says. Citing Bobby Kolade’s past work as an example, she suggests that lighter denim in brighter colours would better suit the regional market.

Plexus does not envision setting up its own denim production anywhere in Africa at present. Mrs Earlam, however, does see potential in the idea that the company could become involved in supplying its cotton for local denim production, whether that be CmiA, Better Cotton Initiative (BCI) or Global Organic Textile Standard (GOTS)-certified fibre. (Incidentally, when *Inside Denim* asked, CmiA revealed that it is not currently working with any denim brands or designers.) Africa traditionally exports more than 85% of its lint cotton in raw form, possessing “very little” industrial textile capacity of its own, she tells us, with a significant proportion of this being lost as a direct result of the disbandment of the global Multi Fibre Agreement in 1994 (the Agreement on Textiles and Clothing which followed expired in 2005).

Elaborating on this, she says: “The textile industry is the industry that has created the most employment over centuries. I would love to see this happen in Africa, where the raw fibre is locally processed all the way through to finished goods and cooperatives allow for the diversification of crops, so more people have greater opportunities.” With the continent’s total population set to swell to almost 2.5 billion by 2050 (representing a doubling of current numbers, according to the UN), the desire to help create skilled and suitably well-paid jobs with strong development opportunities for local young people can only be considered a worthy ambition.

Mrs Earlam is decidedly upbeat about the opportunities ahead for Ugandan fashion, in particular. Discussing one of her favourite experiences in recent years, attending Kampala fashion week, she says that the excitement she felt as a result of the experience left her practically “buzzing” for weeks (particularly as a former art educator). “All the talent and creativity, vibrant colours and local charm – it will stay with me forever.”

Understated sign on the route to Urbania.

ALL PHOTOS: TILMANN WROBEL

Artisans of denim

Italian denim, there are so many things to say… who hasn't had passionate meetings about Italian denim? Aside from the high-quality fabric manufacturing, I have heard countless discussions about Italian taste in denim, Italian design and Italian characters.

Italy is still the home of the world's most prestigious denim-heads, you can find these skilful technicians living part-time in the denim mills in Pakistan, Bangladesh and Turkey as well as the US. These guys manage all types of jeans, including 'accessible' denim, they have an original denim flair. And some of these specialists keep the denim machines rocking in their homeland: the PGs, Elletis and Maurizios [Morosini, Tonello] among them.

I was on a denim mission for a luxury fashion brand from Paris to check the iconic manufacturing places – Cora, Ethica's and Incom – and that's when I met Paolo and Claudia from Agenda-Pesaro (Incom) for the first time. Paolo and his right-hand Claudia are the dream team for extremely well-sewn denim. Paolo is a member of the Fuligni family, which runs an important part of the textile business in the area. The family started a manufacturing unit called Incom and it is here that your premium jeans come alive.

FACTORY TALK: INCOM

When it comes to luxury and premium denim, Italy is a preferred manufacturing and laundry destination. **Tilmann Wrobel** takes us on a trip to Incom, through the beautiful landscapes of Pesaro, close to San Marino.

Why do I say alive? Because it's emotions that bring you and your product alive, and Incom's slogan is "una realita che confeziona emozioni": a reality that builds emotions. Nothing less, so you know! Emotions, we all know – emotions when the sizing does not conform, the batches of blue are mixed up, the hang-tag sizes do not correspond to the product sizes – but here you are in the hands of blue-blooded professionals and Claudia puts all her energy and passion into obtaining the perfect results.

The denim division of Incom (Industria Confezioni Montecatini) was started by Guiseppe Fuligni in 1969. The group initially made goods for local markets, but Incom soon became a magnificent manufacturing unit for beautiful denim. Today, it is proud of its clients – numerous international luxury denim brands, such as YSL, Balenciaga and Roberto Cavalli – and its global relevance, while claiming to be the "artigiani del denim" or the artisans of denim. It also offers extensive research and design to its clients and aims to be a solution finder.

There is precision and care in the smallest details.

Technical touch

What struck me most during my visits was the personalities of the team. Very proud ladies cut and sew your product, many of them with many years' experience, and they embrace any technical discussion with ease.

These types of discussions are the ones I enjoy. You might not know it, but I come from a haute couture background (Avenue Montaigne, Paris) and first learned how to design and make luxury red-carpet dresses. When you work on haute couture, you are always working with the premiere d'atelier (the head of the studio), where the dresses are constructed to your vision and specifications. These ladies (and sometimes men) know so much about patterns, grain direction and fabrics, that you have to be either very discreet and learn from them, or very technically advanced to gain their respect. Now, denim is not haute couture, but you do meet particularly skilful workers who know everything about their machines, the needles, the yarn, the yarn tension, chain stitches and more – and that's when you know your product is in the right hands.

"Very proud ladies cut and sew your product, and they can handle any technical discussion with ease"

This is what you experience at Incom, where Claudia, the team and of course Paolo, provide that feeling that you are on the way to building something special, a beautiful denim with Italian soul and flair.

Tilmann Wröbel is the founder of Monsieur-T, the 'denim lifestyle' studio. He started his career as a haute couture designer before moving into streetwear and denim. He has worked as a designer and consultant for some of the world's top brands, and is based in Paris, France.

MONSIEUR_T_OFFICIAL/PHOTO: CHRISTIAN GEYR

HMS (Hand Made Stone) from Turkish technology provider Baytech.

ALL PHOTOS: BAYTECH

Nothing set in stone

FACTORY TALK

Alternatives to pumice for stonewashing processes are emerging, with innovators claiming their ideas offer a wide range of environmental and economic benefits.

Brands and mills are beginning to call into question traditional methods of using pumice to stonewash denim. Their concerns centre on sludge from worn-down pumice, which comes into contact with, and retains residue of, textile chemicals during interaction with jeans in the stonewashing process. This sludge contributes to manufacturers' waste management burden.

Pumice itself is not toxic. Also in its favour is its abundance, albeit the stones come from a limited number of regions of the world. Turkey, Italy and Mexico are among the best places to source them. Nor are the stones expensive, but they are heavier than many materials in the denim supply chain, with a cubic-metre weighing almost 650 kilos. Bill Curtin, who owns and runs BPD Washhouse, the only full-service, commercial denim wet and dry process facility on the east coast of the US, warns that the transportation costs can easily double the price he has to pay for pumice. Distance is clearly a factor as well in his case; BPD Washhouse is in Jersey City, just across the river from Manhattan and "basically on the subway". Suppliers of pumice in Mexico have confirmed that this is the furthest north they have to deliver, with most other US customers being in Los Angeles, Texas and other southern states.

Another ten years

BPD Washhouse's offering includes a small, pop-up denim trade show and an education resource to help the New York fashion community increase its knowledge of denim. Bill Curtin describes stonewashing as almost a generic term for a whole range of things that happen during wet processing (including washing jeans with water and pumice stones, of course, but also enzyme washing, tinting and dyeing). He explains that it is far from uncommon for people to come to a demonstration and express surprise that stonewashing often involves real stone. He adds that he loves seeing "the joy on people's faces" when they come to this realisation and hearing them say that now they understand.

The effects created by the natural abrasion of the stones hold great appeal, with the results often reminding people of the famous television advertisement in which the late singer Nick Kamen takes off his Levi's 501 jeans in a busy laundromat to wash them. But Mr Curtin says that the difficulties of managing the sludge and also the dust that results from the stones breaking down have increased the appetite for alternatives that offer the same results without the side-effects. His view is that pumice is probably on the way out, but that we are still "in the infancy" of replacing it; it may be ten years or more, in his opinion, before alternatives take over completely. "There is no super urgency to get rid of them [pumice stones]," Mr Curtin says. "They don't harm the workers and the stones themselves don't harm the earth in the way that a bleaching agent would."

Baytech's own visual comparison of the look manufacturers and brands can achieve by stonewashing with conventional pumice and a variety of alternatives.

Options emerge

Alternatives are appearing already, though. "Some stone-free enzymes are actually very good," Mr Curtin says, "without getting 100% of the pumice-stone look. They're very close, but you want to give 100%. So the industry came out with synthetic stones made out of rubber. Again, what we found in working with those was that we didn't really get the look we got from the pumice stone." Something that has come across his path in recent times that has delivered results which he likes is Hand Made Stone (HMS) from Turkish technology provider Baytech.

HMS products are stones made from 60% pumice dust, sealed with biodegradable polymers, which the company says offers similar abrasion to traditional stone but breaks down substantially less, meaning the sludge in waste streams is largely eliminated and the stones last longer. This offers savings in transportation, water, waste, time and energy, according to the company.

Baytech is the brainchild of Yavuz Baykan, an experienced manager at a denim garment manufacturer in Turkey. His initial work on HMS took place while he was still working at the jeans factory, years before he set up Baytech up as a company in its own right in 2016, patenting his idea in 2017. His daughter, Beyza Baykan, who is studying mathematics in the US but still finds time to help bring her father's idea to the global denim industry as company spokesperson, says the initiative came from his lifelong commitment to making the lowest possible impact on the environment. On the land surrounding the factory where he worked he began growing fruit and vegetables, which soon made their way into the workers' canteen. Eventually, his home-grown food programme extended to raising animals on the same site. He is an agricultural engineer by training.

"He could see that the contaminated sludge from the pumice stones was capable of causing damage," Ms Baykan says, "not least by reducing the amount of land available for growing food. His first idea was to try to turn the sludge back into pumice stones, but that was difficult and costly. Then he thought of using pumice dust to do this, dust that comes from the mining companies and is, therefore, free from the chemicals that the sludge contains."

Natural, but not renewable

Turkey is a good place to source this dust. Baytech's figures suggest there is, on average, global production of 18 million tonnes of pumice stones per year, with Turkey contributing 8 million tonnes to the total. "It's a natural resource, but it's neither renewable nor unlimited and we need to avoid using it all up," Beyza Baykan continues. "We need to leave some for future generations and the main HMS idea is to make stones that are more durable so that the industry will use up less of this resource."

Her calculation is that HMS stones are around 80 times more durable than the usual pumice stones. It depends on the quality of the pumice dust, but she has worked out that HMS stones are an average of between 60 and 100 times longer-lasting; 80 is the midpoint of the range. What this means, she explains, is that a denim manufacturer placing an order for 800 tonnes of pumice stones today could achieve what it needs to achieve with just 10 tonnes of HMS. "That's a huge difference," she says. "It would mean reductions in the volume of pumice you'd need to mine or transport. And our stones don't melt the way pumice stones do, so they don't create sludge and this makes wastewater treatment easier and it's easier on the machines in the factory too."

More sludge than stone

Allowing for variations from country to country and from company to company, Baytech believes it currently takes 700 grammes of pumice stone and 100 litres of water to stonewash a single garment. This means an average enterprise producing 10,000 garments every day will need 7 tonnes of stone every day, or more than 2,000 tonnes of stone annually, if you calculate a working year of roughly 300 days. But this does not produce 2,000 tonnes of sludge; the problem is more acute than that. "One kilo of pumice becomes three kilos of sludge," Beyza Baykan says. "It's like a sponge: it absorbs water and becomes heavier than before. Disposing of this is a great problem. How do you get rid of that volume of sludge? We all know that landfill is coming to an end in some countries and, in my opinion, the sooner that happens, the better."

Water worries

In terms of water, she says HMS saves between 20% and 30% per load. Further water savings come later in the process. As mentioned, pumice creates dust during stonewashing as well as sludge and it is necessary to rinse that dust off the garment, which requires more water.

"Sometimes companies have to wash garments three times to get rid of all the dust," Ms Baykan continues. "That's hundreds of litres of water. Our stone doesn't leave any dust on the garments. You can probably eliminate 600 litres of water consumption per load by not having to rinse the garments, and that's in addition to the 20% to 30% water saving per load for the stonewashing process. You have to think about after the stonewashing process as well. There are products that require less water, even no water, in the stonewashing process, but do require a lot of rinsing afterwards to get rid of chemicals from the surface of the garments."

The water that garment producers use with HMS can be cold, which means an extra saving from not having to consume energy to heat it. Eliminating the need for rinsing also lowers energy consumption. Ms Baykan identifies time as another area in which HMS offers savings. "It gives you the effects you need in a shorter period of time," she explains, "and because it degrades far more slowly, the workers will not have to stop production and take time to replace the stones anything like as frequently as they do with pumice. Time is money in the denim industry as in any industry," she observes.

HMS founder Yavuz Baykan was an experienced manager at a denim manufacturing company in Turkey before setting up Baytech in 2016.

Then there is shipping, a hot topic, even hotter even than usual, across all globalised supply chains at the moment. Replacing pumice with HMS will mean a saving in stone shipments. A company that requires logistics service providers to transport 80 containers of pumice stone to it every month would only need one container of HMS, saving costs and considerably reducing the carbon footprint.

Other motivations

Brands and designers may recognise this, but Bill Curtin believes they are mainly motivated at the moment by the results of any stonewashing process. "And there are other processes that they are looking to eliminate too," he explains, "with water at the top of the pecking order. Also, everyone is looking for an alternative to potassium permanganate as a bleaching agent. We haven't had anything that's successful, aesthetically effective or cost-effective yet, but I think within the next few years we will."

Where he thinks stronger demand for alternatives to pumice may come from is "from the middle, from the manufacturer". He thinks manufacturers who choose to use alternatives to pumice and are able to achieve good stonewashing results will also gain from being able to present these alternatives to their customers as something more sustainable. "If you give them the result they want and then tell them that you're doing something that is leaning into sustainability, they will be happy," he says.

insideDenim

BEHIND THE SEAMS OF THE GLOBAL DENIM INDUSTRY

We want our readership to be as valuable and as valued as our journalism. It's why we have left no stone unturned in identifying key global contacts in the global denim industry.

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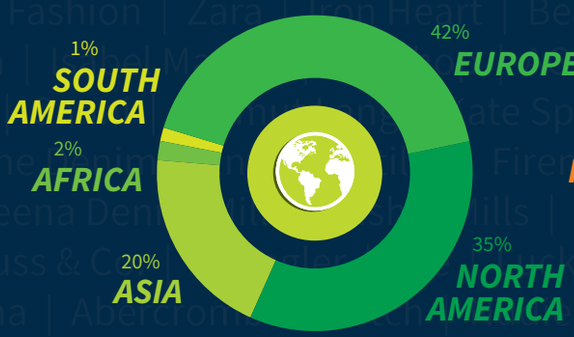

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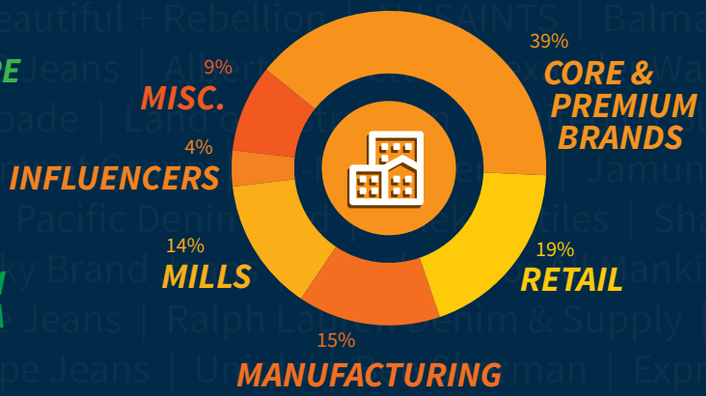

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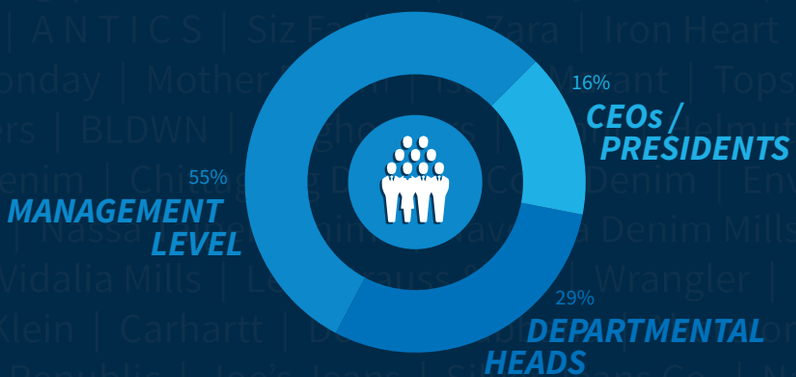

insideDenim will be landing on the desks of those individuals we have hand-picked to receive our magazine: **Global Sourcing** Managers, Product **Development** Managers, **Senior Denim** Designers, **Product Development** Directors, International **Sourcing** Directors, Wash **Technicians**, Senior **Sustainability** Managers, Denim **Laundry** Managers.

Zennure Danisman graduated from Istanbul Technical University's Textile Engineering Department and began her denim career in 2010. She is passionate about sustainable processes and innovation, and is currently head of marketing and washing at Orta.

PHOTOS: ORTA/SHUTTERSTOCK

CLOCKING ON...

Zennure Danisman has discovered a new love for home comforts but still finds inspiration from her location in the heart of Istanbul.

Denim dreams take flight

7.30am

After turning off my alarm, music helps to wake me up. I scan the daily news and look at my notifications from Instagram, WhatsApp, LinkedIn, etc.

8.00am

I have a quick breakfast of oatmeal and milk or yoghurt and some fresh fruit. If it's summer, I put on a summer dress with comfortable sandals. If not, I'll mostly wear my raw selvedge denim or a vintage denim from my originals or the jeans I washed myself in our Kayseri laundry. Then, I'm ready to go to our office, just a 15-minute drive away. Believe me, 15 minutes' drive is nothing for Istanbul and I feel very lucky.

8.30am

I'm at my desk with a beautiful Bosporus view – again, very lucky. It's time for some vitamins before my Turkish tea. My day starts with replying to emails then internal meetings with the marketing team or Zoom meetings with our external partners, mostly in Turkey.

12.00pm

I try to work out two to three times a week at our Orta gym. When the weather is nice, I take a walk to Nişantaşı *(pictured, left)* for some window shopping or for a coffee with a friend. Nişantaşı is a quarter of the Şişli district on the European side of Istanbul. A popular shopping and residential district, it is one of Istanbul's most exclusive neighbourhoods, full of fashion stores, pubs and restaurants. Although I'm more of a traveller, I always feel lucky to have the office in the heart of Istanbul.

2.00pm

It's another golden hour for meetings because it is easy to meet with Europe.

3.00pm

It's our courier time from Kayseri to check the new wash and style developments. I used to travel to our Kayseri factory every week, before the pandemic. Now, I eagerly await the courier.

4.00pm

It's the weekly or biweekly team meeting with the sales team to catch up on market overviews, customer demands and to share our new marketing projects.

5.30pm

End of work. I chat to my mother while driving home; it's my everyday routine while waiting for traffic to flow. Before the pandemic I travelled a lot and needed to prepare my luggage. Or, if I stayed in Istanbul, I headed out to concerts, theatres or events at art galleries. But for the last two years I've become more of a domestic person, going straight home after work. I spend more time on my terrace with my flowers, I have started to cook more and love to try new recipes.

6.30pm

I have more emails to check so I'm glued to my computer, and I look at daily eblasts from my subscribed denim magazines. And then my Netflix time starts, I have lots of series to follow. I also like home renovation, decoration and resell shows on TLC, another indication of becoming a domestic person!

8.00pm

I'm a double-screen person so I watch TV and surf social media. NFT and VR (virtual reality) are on my radar as they are directly related to our new marketing narratives. *(Orta's VR campaign, right and above.)* I'm also motivating myself to refresh my Instagram account, denim_theater. But to be honest, I don't think I've spent enough time on this. Hope for the new year…

1:00am

As I'm not a morning person, I mostly go to bed around 1am with bedtime reading… just couple of pages, then I'm gone.

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