

Although its origins are in the US, dynamic options now exist in Asia for finding new ways to make fleece for outdoor apparel.

Fleece's future

Fleece fabric's history is firmly rooted in North America, with Massachusetts-based Malden Mills producing the first version in 1982 and Patagonia becoming an early adopter. David Parkes, who, before moving on to found textile resource and garment production specialist Concept III, was involved in those early developments, has described fleece as the catalyst that allowed the outdoor apparel industry to establish itself. A performance fabric like synthetic fleece allowed outdoor clothing to set itself apart from apparel in general.

Thirty-five years on, outdoor apparel is a thriving industry in its own right and fleece fabric remains an important product in the eyes of most big outdoor brands. However, something that has changed is that many of the advances in fleece are now taking place outside the US.

Pick up the mantle

On the other side of the world, increasingly vertically integrated Taiwanese fabric producer Kingwhale, which has a longstanding partnership with Concept III, is waiting to pick up the mantle as the industry's foremost innovator and developer of materials of this kind. Its founder, Peter Huang, has a firm belief in his company's future, although he is preparing to step back now from the operation he set up to allow his son, James, to take it forward.

Peter Huang studied textiles at college in Taiwan and worked first as an engineer with a number of Japanese manufacturers, including Kanebo (which now devotes its efforts to cosmetics but was a major player in textiles first, starting as a cotton trading company in 1887 and moving subsequently into silk) and, later, Teijin. At the latter company, he learned about mixing polyester, wool and other fibres together, although Teijin's ambition to achieve strong sales of these wool mixes in the domestic market in Taiwan were thwarted, Mr Huang says, by the island's weather. "It was a climate issue," he explains. "Taiwan is too warm for traditional wool and we only have one season, so those fibre mixes were not suitable for the domestic market."

He then spent a number of years selling European and Japanese textile machinery, encouraging Taiwan's burgeoning textile producers to invest in the best technology they could possibly afford, and always taking care to learn even the most intimate detail of how the

One European sports brand has called Kingwhale's facility "the finest finishing operation in Asia".

Kingwhale

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An example of L.I.T. fabric. Fabrics that are lighter, thinner, easier to care for and with more recycled content are becoming extremely important in the global market, Kingwhale states.

Kingwhale

machines he was selling worked, how they had been put together, how they ought to be maintained and so on. Working during this period, the 1960s, with companies such as Schlumberger and Fleissner allowed him to travel to Europe for the first time. In the 1970s and 1980s, his focus was on Teijin machines and on encouraging Taiwanese mills to use them to spin polyester and nylon.

Fabric choice

Business was "quite good", he says, and continued to be so until the next big change came when, in the late 1980s, Taiwanese manufacturers began synthetic fibre production on home soil. "I was in my late 40s at that stage and was wondering what to do next. I knew I was definitely too young to retire," Mr Huang says. "The cost of yarn was going down and I knew the technology, I knew the suppliers, including which supplier was best for which type of yarn, and they knew me, so I decided to produce fabric and sell it." This is how Kingwhale came into being, showing its first fabrics at a trade show in New York in 1992. When, a few years later, production at Malden Mills was interrupted by fire and the rebuilding of the factory, garment manufacturers had to look elsewhere for fleece fabrics. "Ours was not as good," Peter Huang recalls, "but it was fleece, and it was half the price."

Low impact

Kingwhale built from there and, after years of hard work and millions of dollars of investment, has established impressive facilities in and around Taipei and is producing high value-add performance fleece and knit fabrics. It became a bluesign partner in 2008 and won Oeko-Tex approval in the same year, becoming one of the first companies in all of Asia to earn the recognition of these Swiss-based bodies that certify the sustainability of the textile supply chain. A production facility Kingwhale set up near Taoyuan Airport now has its own dyeing and finishing unit, complete with its own wastewater treatment plant. After a visit, one major European sports brand is reputed to have called the Kingwhale set-up "the finest finishing operation in Asia". It dreams of carrying out its own polymer development, which would make its verticality complete.

In a quest to "do something new" rather than just emulate what was coming out of North America, Kingwhale recently launched a programme it calls L.I.T., for Low Impact Technology. It has developed fabrics made with a modified polyester yarn that can be processed at a lower temperature (below 100°C) and requires less energy and water than conventional polyester. The fabrics have the same wicking and antibacterial performances as traditional polyester and colour fastness is better as L.I.T. can achieve more saturated colours. "Knowing how to modify the molecular structure is the key," Peter Huang explains. "Traditionally, polyester has needed high temperatures and high pressure at the dyeing stage, a process that consumes a lot of energy. Plus, if you mix polyester with nylon or other fibres, those high temperatures and high pressure affect the other fibres too. You can talk about a conflict among the different fibres. It still exists, of course, but we can neutralise the conflict with the L.I.T. process. It's proved perfectly acceptable to some of the biggest brands in the world, including Patagonia, The North Face and Under Armour."

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Kingwhale founder, Peter Huang, spent years building up his knowledge of textiles and how they are made before launching the company in the early 1990s.

Kingwhale

TPP turned on its head

Towards the end of 2016, Kingwhale formed a new partnership with a North American company, joining forces with North Carolina-based knit fabrics producer Hornwood to acquire a knitting plant in the same state. Hornwood is, perhaps, best known as a supplier of fabric to Nike for NBA basketball uniforms. Peter Huang has described the acquisition of the knitting factory by the Hornwood-Kingwhale joint venture as a small but important step in his strategy for securing access to the Trans Pacific Partnership (TPP) market, which now looks unlikely to come to fruition.

Still awaiting ratification (and since the 2016 US presidential election being spoken of as dead in the water), TPP is a proposed trade deal linking 12 countries, including the US, Canada, Mexico, Japan, New Zealand, Australia and Vietnam, but not China and not Taiwan. "At first I thought our way into TPP would be through Vietnam, but I was naïve," Mr Huang says. "Our way into TPP will be this joint-venture in the US." Even if TPP never comes to pass, he believes the new knitting plant will also improve Kingwhale's possibilities with the US's partners in North and Central America.

Taiwan's future

Putting his ambitions in the Americas to one side, Peter Huang remains optimistic about the role his native Taiwan can continue to play as a source of high-performance textiles. He recounts that Under Armour founder, Kevin Plank, is still a regular visitor to Taiwan and that Under Armour currently sources around 95% of the fabrics it uses from Taiwanese companies (including from Kingwhale). During a visit in the autumn of 2016, Mr Plank went on local television and said: "I think the Taiwanese people should take great pride in what they have brought to the textile industry. When I started learning how to manufacture [apparel], Taiwan was the first place I came to. There is always so much fabric innovation here and there is so much thought-leadership across our entire supply-base. Since the beginning of Under Armour [in 1996], one of the keys to our success has been the incredible partnerships we've been able to build in Taiwan. We have four pillars: make great product, tell a great story about our product, service our business and build a great team. Some of the best team-mates that I've built are the textile relationships that I've built in this country."

For Peter Huang, Taiwan's future as a place where the development and production of performance textiles will continue is secure. His opinion is that most of the fibre plants in China are "too big to be flexible enough to react" in the way the market of tomorrow will demand. "There are Chinese companies making enough fibre to produce three million yards of fabric a day," he says. "This means they have to sell on volume rather on innovation. In China, it's all about being big, but that game is over. The textile industry in Taiwan, which Kevin Plank has endorsed, is always trying to make something new. The gene of innovation is here."

Move to material science

Innovation at Kingwhale will certainly continue. The company is working on AlloFibers, special hollow fibres inspired by nature, combining the warmth of polar bear fur with, the company president says, the feel of silk. Outdoor clothing brands will be able to use fabric made from these fibres to lighten the weight of their products

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without compromising on warmth. These fabrics will be on the market before the end of this year," he says. "Everyone loves fleece," Peter Huang explains, "because, with brushing the fabric, it's soft and fuzzy and keeps you warm because it locks warm air close to your body. But we have to do more now: fabrics that are lighter, thinner, easier to care for and with more recycled content are all very important."

To co-ordinate all these efforts, Kingwhale has announced that it will build and run a new Centre for Material Science and Engineering in Taiwan, the fruit of an investment of $6 million. What Peter Huang would like to happen is for Kingwhale to become a material science company, rather than "just" a fabric developer and producer. He accepts it may take time. "If I can't do it, I want James to do it, and if he can't do it, perhaps his son can," he says. "Material science is the future. Companies that were formerly mainly focused on textiles are now producing materials for motor cars and aeroplanes; they are making materials that are replacing steel, and if they can do that they are ensuring they will be here for another 100 years at least." He points out that moves like L.I.T. are already taking his company in this direction. "This set up makes it easier for us to tailor fabrics to each customer's needs," Peter Huang concludes. "We can see the results of any new idea very quickly. We can be very flexible."



Under Armour sources 95% of the fabric it uses from Taiwanese companies, including Kingwhale.

Under Armour



Dry-Tex's newly completed production facility in Shaoxing, China.

Dry-Tex

The world never stands still

Shaoxing-based Dry-Tex is another fabric producer with its eye on winning a share of the lifestyle performance textile market. It too is a bluesign member and it too has invested to build a state-of-the-art production facility, with 200 weaving machines and a finishing floor with high-end lamination and water-based polyurethane coating equipment. Its managing director, Andy Dong, is energetic and ambitious and has built up a detailed understanding of the way the global outdoor industry functions. "He's strong technically," says Chris Parkes, sales director of the company's international marketing partner, Concept III, of Mr Dong, "but he also understands and firmly believes in the importance of marketing Dry-Tex as a brand and in investing in the best technology money can buy."

An example of this is a new low-tension coating machine that Dry-Tex has acquired from European technology providers. It will use it to endow fleece and other fabrics with performance characteristics such as wind- and moisture-resistance without the need of a membrane layer. This will make lighter garments feasible without compromising on durability, an attractive proposition in the face of warmer winters and a decline in sales of heavier garments. It's not proprietary technology, but insiders say Andy Dong may have seen something in the machine that most have not. What is certain is that major outdoor brands are now in talks with Dry-Tex about it; they are intrigued by what Mr Dong believes the technology can do.

It may be the autumn-winter 2018-2019 season before we see the results. Dry-Tex likes to look ahead, it says, because that's what its customers do. Brands have to keep asking themselves what comes next. Subjects that are high on the agenda include translating what lab-testing and measurements tell us is comfortable and water-resistant into a clear perception (on the part of wearers) that new garments perform better than earlier ones. Ultra-marathon runners, for example, have said they don't want clothing to wick moisture away from the skin too quickly in desert conditions as they'd either have to carry more water or risk dehydration. In other garments, lowering the level of rain protection may be one way of reducing weight, which could be of great help to athletes.

Linked to this is the ambition that many outdoor brands share today of using less durable water repellent (DWR) finish, for example, when it is possible to use less and only using more when the wearer's requirement is for a high level of protection. "DWR has definitely been over-specified in some areas," a materials innovation expert at one prominent outdoor brand says, "and this is certainly something we are working on. We can give customers enough protection for their needs without offering the full armour coating to everyone."

He is confident the work of innovative textile developers will never cease. He says: "Athletes are now doing things that, once, we thought were not possible. Likewise, we will need textiles to do things in the future that we think are impossible today."