

The big brands are in a race to bring the latest footwear innovations to consumers and are discovering new 'concepts' along the way.

Shoe Innovations

The big sportswear brands have all launched shoes this year that they claim to be "game-changing", "revolutionary" and "the future of footwear". Nike, adidas, Puma, New Balance and Under Armour are looking to carve out niches and create concepts that did not formerly exist – "the game-changers that successfully fill a need that was there but had not been addressed yet", according to Puma's head of creative and design for footwear, Ray Horacek. He is the brains behind the company's Mobium Elite, which promises "a new way of adaptive running" – the world's first shoe that moves with the foot.

"Aesthetics are an important element on the shelf when a product finally reaches a consumer, but until then the focus of the research, concept, design and construction is about enhanced performance and breaking paradigms," he tells *World Footwear*. "A designer can't remove aesthetics from the process, it's one of the factors that is considered in every decision, but it's one of the lower priorities during much of the process as we're working through the technology."

A new dimension

The athletic footwear sector is fairly crowded at the top end, with the top few competing for marketshare and looking to outdo each other in each sport. Nike claims the lion's share in footwear, with \$13.4 billion sales in 2012, according to Transparency Market Research, followed by adidas with \$9 billion.

The US giant in February launched what it claims is the world's first 3D printed plate for an American football boot, the Nike Vapor Laser Talon (see *World Footwear*, April/May). The plate of the cleat is crafted using selective laser sintering technology (SLS), which uses high-powered lasers to fuse small particles of materials into a three-dimensional shape and which it claims has revolutionised the way it design cleats.

New Balance also tried its hand at 3D printing, customising its high-performance spiked shoes using race-simulation biomechanical data. The company is also working on softer SLS printed components that mimic the cushioning properties of foam midsoles, which should bring the customisation process to a wider customer base.

Keeping within the running sector, Germany's adidas has introduced "a new way to run" with the unveiling of its Energy Boost. Part of a new adidas segment called Energy Running, the shoe features a cushioning technology which provides "the highest energy return in the running industry", according to the company. It partnered with chemical company BASF, which created solid granular material (TPU) that is turned into



Among adidas Boost's features is an outsole that reduces wear in key areas.

PHOTO CREDITS: ADIDAS

thousands of small energy capsules which make up the footwear's midsole. "With their unique cell structure, these capsules store and unleash energy more efficiently in every stride. Tests conducted by the adidas innovation team show that the highly durable material found only in Energy Boost products provides the highest energy return in the running industry," says the company.

The team tested how the Boost foam reacted in a variety of temperatures compared with standard EVA foam commonly used in most running shoes. It says when taken from +40° to -20°C, Boost foam is three times more temperature resistant than standard EVA material, providing a more consistent run.

"Energy Boost will reset the running industry and pave the way for all future performance footwear," says Eric Liedtke, head of the company's sport performance division.





Ray Horecek, Puma's head of creative and design, took inspiration from a cat's paw for the Mobium Elite.

PHOTO CREDIT: PUMA

Cat among the pigeons

Not to be outdone, Puma in April launched what it says is the first shoe that expands and contracts with the foot. The Mobium Elite started life on the drawing board of Mr Horacek, who took inspiration from the paw of a puma. As such, the shoe has 'pads' on the sole, which expand and contract as the foot moves, offering increased cushioning.

"Re-engineering a cat's paw functionality would have been a challenge in itself, but on top of that we needed to fuse that with the expansion and contraction of the human foot," he explains. "Since no one has made a shoe that expands and contracts with your foot in this way or one with a high-tension band in the outsole, we were in completely uncharted territory during most of the design and development process. At one stage [head of research and insights] Christian Harig and I spent almost two full weeks on the floor of the factory in Vietnam just to get the basic construction working."

The Mobium band wraps around the outsole in a figure of eight and is said to enhance natural spring by working like the tendons in the foot. The 'windlass chassis' sculpted arch creates a platform for the foot in movement, helping the foot transition through the full running gait and the design encourages runners to land on their mid-foot, rather than a hard heel strike, which means less "braking action".

Mr Horacek says his inspiration comes from nature or emerging technologies and approaches. "The best ideas are always the ones you happen upon by accident. So I try to always research into areas in which I am not an expert in the hopes of discovering something new that can help us advance performance footwear."

In all, the process included research, design, prototypes of early models before prototypes of the final idea, seven sample moulds and several rounds of testing. "For every new technology on the shelf, there are at least 10 other shoes at various stages that didn't make it through the process, and the number of sketches and ideas would usually number well into the hundreds."

Keeping an eye on the competition is vital – but it's also important to keep up with innovations in all major industries, he adds. "With other brands, though, it's as much of a reference for what not to focus your time on ... especially when your goal is to come up with something truly groundbreaking."

Heel 'cups'

US-based Under Armour, better known for its apparel and taking only a modest share of global sportswear sales, has made a play for the big boys with its soon-to-be launched SpeedForm concept. It says they are the first shoes that have not been made in a footwear factory; instead they are manufactured at one of its clothing suppliers – specifically, a bra factory in China – and are said to have the same "genetic make-up" as a bra.

The company has big ambitions: it launched its first footwear range in 2006, grew the sector to \$127 million in 2011 and expects to reach \$290 million by the end of this year – an impressive annual growth rate of 44%. Propelled by the SpeedForm range, it predicts footwear revenues will double by 2016 to \$300 billion – by which stage it is hoping to be in the top three running shoe makers globally.

"When we look at the landscape in 2013, I think the most important thing is that we've learned what it means to truly be a footwear company, not an apparel brand who's making shoes, but a totally integrated footwear company," says its CEO Kevin Plank. "And you haven't seen anything yet. We are truly just getting started."

The company spent three years trying to come up with a completely new way of making shoes when it hit upon the

Puma's Mobium, based on a cat's paw, moves with the foot.

PHOTO CREDIT: PUMA



Footwear sales in millions

Company	Fiscal 2010	Fiscal 2011	Fiscal 2012	Growth Rate (2010-12)
Nike	\$10,301	\$11,518	\$13,426	14.2%
adidas Group (includes Reebok)	\$7,021	\$8,132	\$9,018	13.3%
Puma	\$1,856	\$2,006	\$2,078	5.8%
Under Armour	\$127	\$182	\$239	36.6%

Source: Transparency Market Research.

SpeedForm idea. It looked at how cycling apparel and rock climbing kit fit the body in the most snug way – and the “stars aligned” when contemplating the NASA space suit, according to head of creative design Dave Dombrow. He took inspiration from the fact that lingerie group Playtex won the contract to make the spacesuits, as they had knowledge of the body and fit—which is when he thought of using a bra supplier.

Made from a similar padded material to a bra, the SpeedForms are produced from a single piece of seamless material and are devoid of stitching. They mould themselves around the foot with the premise that the closer the fit, the faster the wearer will run. “Nothing has ever fit like this, I promise. It couldn’t, it’s never been done,” says Mr Dombrow.

With marketing still to be finalised, the company hadn’t released any photography at the time of going to press, but a

big launch is expected towards the end of the summer.

Last year, when Nike and adidas went head to head with knitted shoes – for Nike the Flyknit and adidas the Primeknit, both claiming to be world firsts and three years in development and then launching within weeks of each other – industry observers mulled the implications for the wider industry. By making the upper from a single piece of material on a loom, they could perhaps sideline factory workers and create an argument for nearshoring, or bringing manufacturing nearer to brands’ headquarters. Although they might not have taken off in the way the companies would have liked (perhaps due to Nike suing adidas for copyright infringement), the Under Armour innovation could also make manufacturers take note. “We stumbled upon something bigger than a shoe – it’s a new way of manufacturing,” concludes Mr Dombrow. “It’s a big, big, big deal.”

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