

Technological advances in running shoes are as old as the business itself. In 1971, Nike co-founder Bill Bowerman created a sole by pouring **urethane** into a waffle maker. Urethane is an artificial rubber. Since then, the company has relied on cutting-edge methods.

In January 2016, Kenyan marathoner Eliud Kipchoge tested a new shoe that would come to be known as the Nike Zoom Vaporfly Elite. The Vaporfly series, and the Alphafly series it began, broke barriers. It also sparked controversy.

"The Essence Of Progress"

Track and field's governing body had to respond to the shoe months after Kipchoge wore an early model of the Air Zoom Alphafly Next%. In the shoes, he became the first person to run a marathon in less than 2 hours. Nike calls Kipchoge "the **essence** of progress." His shoes, wrote South African sports scientist Ross Tucker, "**disrupted** the meaning of running."

Other sports have struggled for years with questions about fairness and advances in equipment technology. Distance running was slow to realize it faced the same problems. For many years, the sport's leaders regulated shoes as if they were clothing instead of sports equipment.

"If you wanted to put everybody on the same starting line, you can require people to run with their bare feet," said Damiano Zanotto, the head of the wearable robotic systems lab at Stevens Institute of Technology in Hoboken, New Jersey. "Which doesn't make any sense. There is not negative or bad technology. There is a need for regulation, and clear regulation."

World Athletics is the track and field governing body formerly known as IAAF. The organization recently released new rules aimed at **curbing** the effects of advanced technology. Critics, including rival shoe company executives, called it a compromise that came too late.

"I do think as a governing body, they need to start thinking about the shoe as the piece of equipment," said Shawn Hoy. He is Saucony's vice president of global product. "It's no different than a golfer's clubs or a tennis player's racket."

Using Old Ideas In New Ways

The Vaporfly updates old ideas and uses them in new ways. It features a springy, carbon-fiber plate in the midsole, which Fila had done in the early 2000s. It uses a new foam substance Nike calls ZoomX, an update of an Adidas material. Nike also made the sole extra thick, which plenty of companies had tried.

"I only really became aware of these shoes in early 2019, more or less when the world at large became aware," said Tim Hutchings, an NBC Sports commentator. "Even then, few had any idea of the seismic shift in runner times that they could produce."

Research showed that the shoes improved running **economy** by an average of 4 percent, a monumental total. Runners who used them could break records, and runners who didn't could not keep up.

Even if everyone had the shoe, it might still create unfair advantages. Some runners, according to studies Tucker cited, respond to the shoes' technology more effectively in terms of running efficiency. Those who respond well have a massive

advantage over those who do not. Runners who do not respond as well to the shoe could be cut at an early age from competitive running.

Danny Orr, New Balance's general manager for performance, said Nike could have been more **transparent** with the IAAF as it developed the Vaporfly. However, he joined other experts in putting the responsibility on the sport's governing body to create rules for companies to innovate within.

A Missed Opportunity

"Very early on, we saw results that were unprecedented with that product, and we felt like at that time the world governing body probably had the opportunity to act," Orr said. "The fact that they didn't since 2016 is what's put us in the position today."

Last October, Kipchoge became the first person to run a marathon in less than two hours. He wore the Next%, an evolutionary, extra-chunky version of the Vaporfly. The next day, Brigid Kosgei shattered a 16-year-old women's record by 1 minute, 21 seconds in the Next%. The Guardian newspaper reported that the Next% could boost a runner's efficiency by 7 to 8 percent.

"I don't know if we'd be having this conversation if not for the Kipchoge sub-two-hour marathon," Hoy said.

On January 31, World Athletics acted in a way that left few satisfied. It ruled that shoes worn in competition must be "readily available" for four months and could not be a test model. For distance running shoes, it placed a ban on soles thicker than 40 millimeters and the use of more than one plate.

Preserving Integrity Of Elite Competition

"It is not our job to regulate the entire sports shoe market but it is our duty to preserve the **integrity** of elite competition," said Sebastian Coe. He is president of World Athletics.

Experts viewed the changes as insufficient. Zanotto said there are reliable ways to test how much energy a shoe can store and recover. Regulations should be based on those, he said, and not simple measurements.

Shoe companies were also upset by the new regulations pertaining to test models. Hoy said there was no clear definition of "readily available." Orr said New Balance had planned to release some shoes after the 2020 Tokyo Olympics. Now it must rush them to stores by April to ensure its athletes can use them.

"Our biggest concern is, nobody picked up the phone and asked us what we thought or included us in the decision-making process," Orr said.

It will likely be a matter of time before the next leap forward, before the next controversial shoe stirs a similar conversation. How innovation affects competition is what matters to fans. What keeps the competition afloat, though, is a running shoe business that needs to sell the next great idea.

"I don't believe the gap between what Nike has created in this space vs. what we are capable of creating is significant," Hoy said. He hopes that, four years from now, one of his company's shoes might be the subject of the same conversation. "That's what keeps you moving forward."

Questions

1. Which piece of evidence explains what caused the Vaporfly shoe to significantly increase runners' efficiency?
 - a) The Vaporfly series, and the Alphafly series it began, broke barriers.
 - b) The Vaporfly updates old ideas and uses them in new ways.
 - c) Research showed that the shoes improved running economy by an average of 4 percent, a monumental total.
 - d) The Guardian newspaper reported that the Next% could boost a runner's efficiency by 7 to 8 percent.
2. Which section of the article BEST explains why shoe companies were unhappy with new regulations related to early versions of running shoes?
 - a) "The Essence Of Progress"
 - b) "Using Old Ideas In New Ways"
 - c) "A Missed Opportunity"
 - d) "Preserving Integrity Of Elite Competition"
3. Based on the article, what is the MOST likely reason the author includes the perspective of Sebastian Coe?
 - a) because he is president of track and field's governing body and therefore has a stake in the fairness of elite competition
 - b) because some industry insiders suspect that the new shoe regulations are intended to give an advantage to one company
 - c) because shoe companies have complained about the difficulty of innovating when the rules for footwear keep changing
 - d) because his job is to show how rules on competitive running shoes are affecting athletes as they train for the 2020 Olympics
4. What is the author's purpose for writing this article?
 - a) to illustrate the controversy surrounding recent innovations in running shoe technology and the running world's response to them
 - b) to explain why competitive running's governing body has neglected to implement clear regulations on running shoes until recently
 - c) to describe the various innovative features of the Nike Vaporfly line that allow it to significantly improve competitive runners' performance
 - d) to show how Nike's competitors have responded to the Vaporfly shoe by introducing their own products with similar features