

Someone is going to get rich selling cameras for virtual reality. But who?

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If virtual reality lives up to its hype, someone is destined to get rich from building the medium's first mass-market camera.

Han Jin asks, why not him?

The co-founder and chief executive of Lucid VR thinks he's made a device small and cheap enough to appeal to anyone. His LucidCam fits in your hand like a bar of soap and is available for pre-order at \$399.

His prototype, cobbled together inside a one-car garage that would hit triple digits during the summer, was novel enough to win Jin \$115,000 in crowdfunding last year. Add to that \$2.4 million in venture capital funding, and the 28-year-old entrepreneur has reason to feel bullish about the prospects of his Silicon Valley company.

"There are plenty of startups, and I'm sure tons and tons of similar products coming out soon," Jin said. "But at the end of the day, we've created a very simple product that anyone can use. You don't have to be tech-savvy."

Lucid is one of a slew of players, both large and small, who are scrambling to establish themselves in the burgeoning market for VR-enabled cameras.

Among them are big-name brands like Samsung, Ricoh and Kodak, and newer entrants like Bublcam, 360fly and Vuze.

The opportunity before them is potentially huge - especially with the field wide open. Deloitte Global predicts the VR industry will crack \$1 billion for the first time this year, \$700 million of that coming from hardware such as headsets, cameras and computers. By 2020, the industry could top \$30 billion, according to Digi-Capital.

Almost every leading tech company is making a play, including Facebook's Oculus Rift, Samsung's Gear VR, Google's Jump VR and YouTube's 360-degree platform.

What they all need is content (a catch-all phrase for video, games and other media). And that's where Jin and his competitors come in.

"We're going to see a lot of VR headsets on the market the next few years, which means a lot of people will want to create their own content," said Brian Blau, an analyst at research firm Gartner. "The question is how easy or difficult it will be to make effective 360-degree video. Device makers need to create a nice, simple workflow."

If a camera-maker can deliver a functional and affordable product, that company may become the next GoPro.

The firm took the ad hoc camera rigs favored by surfers, skydivers and other adrenaline junkies and turned them into a polished, easy-to-use product that still could take a beating.

With their affordability, wide-angle lens and HD-quality picture, GoPros were perfectly suited for extreme sports in the YouTube age - selling millions of units since their debut more than a decade ago and building a market where there was none before. (Jin calls GoPro "the inspiration" for Lucid.)

But GoPro has fallen on hard times. Its stock has lost nearly 90 percent

of its value since its peak in 2014, the year GoPro went public.

One way analysts think it can dig itself out of trouble is to recapture the magic of its early cameras, but in virtual reality.

"GoPro is hurting pretty bad, and VR seems like a natural progression for them," said Eric Abbruzzese, a senior analyst for ABI Research.

"They've lost a lot of market share for their sports camera because smartphones have gotten so much better. If they could just replace them with a 360-degree camera, that could help them out a lot."

The embattled company's answer to VR so far has been to invest in professional-grade cameras and editing software, including acquiring French "spherical content" startup Kolor last year. It manufactures two high-end 360-degree cameras - the Odyssey, which sells for \$15,000 and works with Google's Jump, and the Omni, which will go for \$4,999 when it's released later this summer.

Executives won't say whether the company plans to release a consumer-friendly 360-degree device priced in the hundreds rather than the thousands of dollars, though. Instead, GoPro appears to be taking a wait-and-see approach to the young market.

"VR is an important part of GoPro's long-term business strategy, but industry-wide, there's a lot of maturation that still needs to happen," C.J. Prober, GoPro's senior vice president of software and services, said in an emailed response to questions. "Technological advancements are moving fast, and there are meaningful investments driving the evolution of VR. We see lots of promise, real-world applications and next-level storytelling."

GoPro faces an increasingly crowded market as it courts professional videographers making the transition to VR. Some of the most coveted

rigs are made by startups Jaunt, which has raised \$100 million in funding from investors such as the Walt Disney Co., and Lytro, which has raised over \$150 million and counts venture capital powerhouse Andreessen Horowitz among its backers. Facebook is developing a \$30,000 VR camera, and Nokia sells one called the Ozo for \$60,000.

Those cameras, of course, are for a select few. Winning the consumer market could have a more dramatic impact on a company's fortunes.

If GoPro decides to wade in, its stiffest competition would come from Ricoh, a Japanese brand better known for its copiers than cameras.

Those copiers, however, forged an expertise in imaging that helped Ricoh emerge as an early adopter of digital cameras in the 1990s. Today, the 80-year-old company is an early market leader in consumer 360-degree cameras with the Theta S, now in its third generation. The handheld camera that looks like a TV remote control with a lens on one end sells for about \$350.

"We knew VR was on the horizon, so we were the first to enter," said Linnea Wolken, director of marketing for Ricoh Imaging Americas. "Ricoh established a VR division in Japan, recognizing how much of a flagship this would be."

To promote the device further, Ricoh has allowed developers to tap into the Theta's software in hopes of building an ecosystem of apps and accessories around the camera.

Good software could smooth out many of the kinks consumer-friendly 360-degree cameras currently face. That includes low resolution, limited memory and trouble with stitching - the combining of videos to build a panoramic view.

Lucid VR's answer to these challenges has been to simplify the camera. Instead of a 360-degree view, the LucidCam offers a 180-degree vantage. That means less memory and computer processing is required. It also limits the headaches associated with stitching by using proprietary software to read and process video data in real time.

"We wanted to design a device that had the same user experience as a normal digital camera so that it would be simple," Jin said.

Morris May, founder and chief executive of VR production company Specular Theory in Venice, is a fan of Lucid's simplicity. The filmmaker, who had one of his projects shown at Sundance Film Festival, said all VR cameras, regardless of sophistication and price, have their shortcomings - be it light, sound or clarity.

"There is always something wrong with VR" cameras, he said. "One-hundred and eighty-degrees gives you less that's wrong."

The LucidCam can be toggled between video and still image settings. The results can be viewed on a VR headset such as a Google Cardboard. You also can livestream video on the camera, which is small enough to be strapped to your head or chest like a GoPro.

Jin is a fan of GoPro founder Nick Woodman, a surfer who started out selling camera straps out of his Volkswagen bus. The straps allowed surfers to capture the action up-close, planting the seed for the game-changing company years later.

That kind of success will be hard to replicate in VR, said Blau of Gartner.

"The likelihood of a small company making a new camera that could follow the footsteps of GoPro is slim," he said. "It's not impossible, (but)

it's a lot more challenging in VR. It's an exotic format. Not a lot of people view that kind of content yet. I tend to think a bigger company can stomach the risk of making an experimental camera."

The irony wasn't lost on Prober of GoPro that the company's early success may have spawned some of the competitors it faces today in a new technology.

"The history of GoPro shows that you should never bet against a highly motivated entrepreneur," he said.

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