

Take a bold leap into a brave new world

Despite decades of hype, virtual reality has never been quite ready for prime time. That is about to change, with implications for industries from gaming to engineering. Matthew Partridge reports

It's match point and I'm serving. I throw the ball up in the air and swing my paddle. The ball hits the table, then flies just above the net. My opponent manages to get to it, but his return is just a little too high and I smash it. Game set and match to me. The game is taking place on top of a mountain and my opponent, who appears as a pair of hands, with a cat's face but no body, lives thousands of miles away. I haven't left my kitchen. Welcome to the new world of mainstream virtual reality – a world now backed by two of the world's most powerful technology companies.

Beyond the false dawns

Virtual reality (VR) isn't new. Even before people were playing *Pong* on the Atari game console in the 1970s, researchers at MIT had developed an early form of virtual reality called the "Sword of Damocles", says Alastair Unwin of the Polar Capital Technology Trust. But although there have been attempts to master VR for a long time, "it has always been a big problem to render an experience that doesn't make you dizzy or cause eyestrain". It doesn't help that putting on the kit, whether it's a headset or some kind of visor, makes you look "just a bit bizarre".

The industry has suffered several "false dawns". In 2013 Google developed a technology that projected information from a computer onto a pair of glasses, with the idea that the wearer would be able to surf the internet by voice command alone. A few years later another technology company came up with the "Magic Leap", a pair of goggles that made similar promises. Both devices flopped, but Unwin thinks that this time is different. VR has "now moved on from its heavily hyped days" and is "starting to find productive uses", attracting serious investment from major companies.

Steve Caruso of software developer Ustwo agrees. The real problem with earlier incarnations was that VR headsets were limited by the need for a physical connection to a high-performance gaming or workstation PC. This meant that users had to spend thousands of pounds on the latest machines, then go through an "onerous set-up" process, sometimes involving placing tracking hardware around their rooms. Even after all that they were restricted in their movements by the length of the cable tethering them to the main machine, which undermined the whole immersive nature of the experience. As recently as five years ago, they also still suffered from low resolution and big lags between user input and screen output, which made the overall user experience "awful", says Vlad Susanu, founder of gaming website GameClubz.

Apple signals a turning point

This all changed in 2019 when Facebook (now Meta) released the Oculus Quest (now Meta Quest). This device was "completely self-contained", in that it didn't need any other hardware, was "less expensive", and required hardly any set-up, says Caruso. These principles were rapidly adopted by Meta's competitors, such as HTC, Pico and now Apple. The quality of the games and applications available still lags behind those

that you can get on a desktop computer, but "new processor designs and manufacturing processes" mean that even this barrier is starting to disappear.

Apple's decision to enter the market for VR, through the release of the Vision Pro headset last month, is particularly telling, says Dan Ridsdale of investment research firm Edison Group. Google has a strategy "of releasing lots of products in the expectation that many of them will fail"; Apple, though, "thinks a lot more carefully about what it does", and only enters a market when it thinks it has reached the stage where it has starting to achieve a critical mass, both in terms of demand from the technology sector and from the market.

You could even argue that everything Apple has been doing in the past few years has been leading up to this point, says Ridsdale. A case in point is the ability to film in 3D, which appeared on the iPhone 15 and was released last September. Taken alone, such a feature would seem like a gimmick, as very few people watch 3D films. But such films work particularly well on the Vision Pro, which suggests that Apple specifically included this feature with the Vision Pro in mind. The current price of \$3,499 makes the Vision Pro too expensive to conquer the mass market, but it certainly "opens up the possibilities of what VR can do".

Indeed, the strides made by the latest systems have been "nothing short of revolutionary", says Susanu. The latest versions are "light years ahead" of even their immediate predecessors, with higher pixel counts, faster response times and integrated 5G connectivity. They are now so good that, rather than getting annoyed and frustrated, Susanu often forgets he even has a headset on, which "unlocks experiences like no other" technology.

A growing force in gaming

Recent advances in processing speeds and the quality of graphics, as well as the emergence of systems that provide "oven-ready" experiences, requiring minimal set-up, mean that VR is already a "significant and growing segment of the games industry", says Richard Wilson, CEO of The Independent Game Developers' Association (TIGA). VR currently accounts for a much smaller portion of sales compared with traditional platforms such as PCs, consoles and mobile, but Wilson is starting to see evidence of "encouraging take up among sizeable niches of both new and seasoned gamers", as customers become aware of the "unique game-play".

Wilson predicts that this growth will continue as the improvements in graphics, motion tracking, and user interface continue to "enhance the VR games proposition in the coming years, attracting more users and developers". Already it has "opened new avenues for innovative approaches to game design", especially for smaller developers, with many independent games studios combining VR with complementary technologies, often with "spellbinding results".

Ridsdale agrees that the VR boom is currently following the pattern set in the early days of mobile gaming, "where independent developers led the

"Everything Apple has been doing in the past few years has been leading up to the launch of its VR headset"



Virtual reality is going to be a game changer when it comes to training engineers and doctors

charge” and then bigger developers step in and build on developments. Indeed, the success of some independent games studios is “already starting to convince the major studios that VR is a profitable area”, which they are beginning to take seriously. The most typical route taken by the large developers into VR is to “take slightly older games that have been successful on ordinary computers and adapt them for VR” (the VR version of the role-playing game *Skyrim*, for example).

Convincing big developers to spend money on tweaking their games for VR is impressive enough, but Risdale notes that we are even starting to see the emergence of big-budget (AAA) games that are specifically designed for virtual reality, either as parts of existing franchises, or original propositions. He points to estimates that suggest sales of VR games will increase sevenfold from \$13.8bn last year to just under \$100bn by 2028, before rising again to \$163bn by the end of the decade. This growth will be “spread across various devices and platforms, ranging from pure VR devices, to augmented- and mixed-reality devices, which combine both the virtual and real worlds”.

A virtual test drive

The gaming and entertainment industries aren’t the only ones that are going to be disrupted by the rise of VR and related technologies, says Omar Moufti of iShares by BlackRock. He is enthusiastic about its use in modelling, especially when it comes to what are known as “digital twins” – ultra-realistic digital models of a real-world space that allow the user to

replicate a component or machine, then simulate the effects of stress and wear and tear.

The benefits of such VR simulation increase with the complexity of the design, and such simulation is already starting to be used in architecture, says Moufti. The renewable-energy sector has also been an eager adopter. Offshore wind farms, for example, use the technology to decide where to place their wind turbines and to test how they will react to extreme events. Moufti thinks that the technology also has “tremendous potential” in medicine. It could “help speed up the training of doctors and surgeons”, for example, as well as play a role in improving the quality of telemedicine in remote areas.

In fact, VR and mixed reality are going to be “game changers” for training in a whole range of industries, says Maani Safa, CEO and founder of digital creative agency Poppins. He predicts that it will be particularly useful in “high-risk industries, such as oil and gas, or aviation”, where realistically simulating real-world life-or-death scenarios is currently very difficult (and expensive). As well as “enhancing learning outcomes” by giving employees “hands-on experience in a safe, controlled environment”, VR will “help reduce training costs” too.

VR is already starting to “become invaluable for remote assistance and communications”, says Safa. Like Moufti, he highlights the car industry, engineering and healthcare as three sectors where there are obvious benefits. He also sees his own

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industry, marketing, as one that is starting to find practical uses for VR, especially when it comes to “transforming traditional marketing strategies into interactive engaging experiences for brands”. Indeed, his agency has created VR experiences for several car companies, including a virtual test drive for VW, which “provides a realistic experience of driving a car without leaving the showroom”.

Towards the metaverse

The progress of VR in establishing footholds in everything from gaming to marketing over the past few years has been impressive enough, but the real pot of gold will be when the technology becomes so widespread and convenient that it becomes one of the main ways, or even the main way, that people communicate with each other. The most prominent cheerleader for this “metaverse” of virtual worlds is Mark Zuckerberg, who was so convinced by the idea that he rebranded Facebook as Meta in 2021.

The reality failed to live up to the hype “and even Zuckerberg has started to downplay” the idea, says Alison Porter of Janus Henderson Global Technology Leaders Fund. Still, Zuckerberg may just have been “early”, rather than completely wrong. (Unwin points out that chip company Nvidia is working on its own version of the metaverse, called the omniverse, aimed at industry.) Porter thinks he is “on the right path” in that virtual reality, combined with other technological innovations, such as generative AI, will lead to “a fourth wave of computing”. At the same time as banging the drum for the metaverse, Meta has also invested in AI, with the aim that the two technologies will become inseparable. At the very least, VR “will speed up the way in which we interact with AI-produced content”.

Zuckerberg’s dream that we will spend all our time in a “monolithic virtual world operated by one company” may struggle against “the direction that the social internet is heading in” as it fragments



The VR experience has been transformed by recent developments

and attracts increasing regulatory scrutiny, says Caruso. Still, as VR “matures over the next decade”, with headsets shrinking to the point where they become “almost invisible”, the technology will start to become so powerful that the boundaries between the virtual and real worlds will begin to blur. At some point, the idea of something happening “offline” may even become an “obsolete notion”.

Whether the metaverse ends up being one platform, or the more likely scenario of a collection of platforms “where users have more control over their data and how it is used”, it is a development that has the potential to change the global economy radically, says Carl Hazeley of financial information platform Finimize. Caruso points to a McKinsey report that estimates that the metaverse could have an economic impact of “up to \$5trn by 2030”. This will include not just the relatively low-hanging fruit of gaming and advertising, but also areas such as ecommerce. The promise of VR and the metaverse is that they will become the key way in which people will interact in the future.

“VR tech promises to blur the boundaries between the real and virtual worlds”

The key investments to consider now

There are several exchange-traded funds (ETFs) that allow you to track the growth of the metaverse and virtual reality without picking individual winners. One is the **iShares Metaverse UCITS ETF**, which tracks the STOXX Global Metaverse index. It has 68 holdings in total, with an average price/earnings ratio of 37 times. The largest include chipmakers Nvidia and Intel, which should both benefit from the increased demand for powerful computer chips brought on by the graphics-intensive nature of VR; digital-currency platform Coinbase; and Meta Platforms. The total expense ratio, a measure of an investor’s total cost, is a relatively modest 0.5% a year.

Meta Platforms (Nasdaq: META) is also worth investing in as a standalone investment. The most obvious beneficiaries of the VR and metaverse boom are the companies that own platforms, as Caruso points out. The company’s decision to reinvest the money generated by Facebook and associated media platforms into its plans for the metaverse is controversial with investors, but even if these don’t immediately pay off, its revenue is still growing by 15%-20% a year and it has started to pay a dividend.

The valuation of 22 times 2025 earnings looks very reasonable.

Although it is still early days for both VR and the metaverse, the fact that “content creation for immersive media is more complex and expensive” than for ordinary television and video games suggests that the large entertainment conglomerates will have “major starting advantages”, says Caruso. This should be good news for companies such as **Disney (NYSE: DIS)**. Disney recently invested \$1.5bn in games developer Epic Games, creator of the online hit *Fortnite*, with the aim of building a games and entertainment offering. Disney is also investing in VR-related hardware, including the HoloTile, an omni-directional treadmill that will allow multiple users to walk freely in VR, even in confined spaces. Disney trades at 20.6 times 2025 earnings.

Software companies are also going to be obvious winners from the boom in VR, says Unwin. One company already starting to make strides in this area is **Electronic Arts (Nasdaq: EA)**. Many of EA’s games, such as its racing and rallying franchises, have VR modes, and some games, such as first-person shooter *Medal of Honor: Above and Beyond*, are now exclusively VR. Sales are growing by around 7%-8% a year, and EA is

generating a return on capital expenditure of 14%. It even started paying a small dividend last year. Despite this, it trades at only 18.5 times 2025 earnings.

The rise of VR will make designing the graphics for games and applications even more complicated. This is good news for **Unity Software (NYSE: U)**. It specialises in tools, most notably the industry-standard Unity engine, that can make it easier for firms to develop applications with real-time 3D-graphics. It is used by games developers (by 69% of the top 1,000 mobile games, for example), architectural firms and aerospace engineers. Unity doesn’t make any profit yet, making it a slightly riskier investment than the other companies, but revenue is exploding, with overall sales having quadrupled since 2019.

Those with a tolerance for risk might also consider the micro-cap **Engage XR Holdings (Aim: EXR)**. The Irish firm has developed a metaverse platform for firms to help with collaboration and training. Engage has more than 200 customers, including KPMG, HSBC and Stanford University. It is still losing money, but revenue is up over six times over the last five years, and is expected to continue growing by around 50% a year for the next few years.