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Happy New Year! Hopefully everyone was able to relax, spend time with family and enjoy good food over the holidays. Gretchen and I, and our four sons, spent Christmas Eve at my mom's. Christmas Day was quiet at home with the boys and Gretchen cooked a delicious Christmas dinner. (Not really that quiet). After Christmas we were able to get to the foothills for a few days of R&R.

I've enclosed a very interesting read from the investment firm, Harding Loevner. Many of you are invested with them through their emerging markets fund. To be blunt, it was a bit of a heavy read for me. I pushed through because they have a knack for taking a complex subject and explaining it to a guy like me. And, they are really smart. I'm glad I read it and encourage you to do the same.

The last time I wrote I mentioned inflation being a lot more stubborn than policy makers anticipated. Finally, the Federal Reserve seems to agree. In my calls with some of the research and investment people around the industry talk is still inflation. Some of the things I'm hearing:

The Golden Age of Bonds, when interest rates and inflation went down, is over.

Inflation should settle in somewhere between 2 1/2 - 3% in the latter half of '22 versus a 1.8% annual average between the financial crisis of 2008 and the pandemic.

This February will be my 27th year in the investment business. I've heard that statement about bonds and interest rates many, many times. The investment people that are saying it now are the type of people I take seriously. And the drivers of inflation:

Housing... little has been built in the last ten years.

Constraints at ports... especially trucking in and out of ports.

Shortage of labor... 1/2 of pandemic deaths were among people of working age and since the end of '19 there are 3.1 million fewer workers in the U.S.

To me that last point says people are dropping out of the workforce. We touched on some of the reasons for that in the last letter.

We will invest accordingly but, from an investment perspective, not much will change. Emphasis on diversification on the equity/stock side and quality, short to intermediate term bonds.

My best wishes for a happy and healthy new year!


Antone Mercurio, CFP®
Investment Advisor

Enclosure

Modeling the Metaverse: Facebook, Apple, Meta, and the Fight to Profit from the Next Big Thing

What has long been a subject of science fiction—a totally immersive virtual world inhabited by all of humanity—is increasingly a part of Big Tech companies' plans for future growth. And the winner is...

October 2021



Key Takeaways

- The hardware required for entering the Metaverse is still clunky and the content scant, but the remaining technological hurdles seem to have reached the stage where they can be solved with time and money.
- A concert in 2020 attended by 27 million avatars already suggests some experiences could be just as good, if not better, in the Metaverse.
- Valuing technology companies has always involved trying to get a handle on the future rewards that will come to those that succeed in exploiting totally new platforms.
- For Apple, the business model is straightforward: replicate the experience of using an iPhone in 3-D. For Facebook, the model involves using its own hardware as a cudgel to keep a larger share of the advertising spoils.

CEOs spend a lot of time communicating their visions for their companies to a naturally skeptical public. Traditionally, this involves traveling around the country or world to interact face-to-face in conference rooms or auditoriums, or, over the past two years, logging into an endless series of video calls. But recently the top executive at a Prague-based technology startup tried presenting in another realm altogether.

This presentation came during a virtual conference hosted by JPMorgan titled “Ready Player One,” after the science-fiction novel by Ernest Cline about a society in the near-future when all of humanity uses a virtual simulation to escape the drab reality of their lives. The speaker was Artur Sychov, CEO of Somnium Space, one of the first open-source platforms designed specifically for virtual-reality users. Instead of wearing the usual business suit, Sychov appeared as a black-clad superhero-like avatar. Behind his avatar, you could see the sparse expanse of the Somnium landscape extending in every direction. The sun was just starting to peek over a virtual horizon, and a handful of buildings rose nearby including the dome of a planetarium.



Source: PodFest Asia.

Artur Sychov, CEO of Somnium Space.

For those logging in from home laptops and office workstations, Sychov provided an opportunity to experience a concept which has been a key talking point for many tech industry CEOs in 2021. That concept—now commonly called the Metaverse—is a totally immersive version of the internet where, instead of just viewing and listening to content, users feel as if they are *in* it. Initially built atop the existing internet, the Metaverse could eventually become so pervasive and so absorbing that it subsumes the current 2D web (at least that’s the idea), offering compelling facsimiles for almost every activity people can experience in the physical world, with the possible exceptions of eating and sleeping.

Recent evidence of tech companies’ intense focus on the Metaverse abounds. At a Microsoft conference in May, CEO Satya Nadella spoke at length about his company’s new “Azure Digital Twins” that allows its enterprise customers to create live always-on simulations of their products, facilities, processes, and people. Google has gone on a major hiring spree to beef up its engineering staff for augmented reality (AR) search. Apple

has quietly been buying up early-stage AR and virtual reality (VR) startups in areas from advanced optics to virtual events.

Of the large-cap players, Facebook and its CEO Mark Zuckerberg have publicly been the most all-in on the concept, declaring that in the future people will associate Facebook more with the Metaverse than with social media, and pledging a major increase in capital expenditures to ensure that they do. In October 2021, the company even went so far as to change its name to Meta to reflect the seriousness of that ambition (and to try to move on from the controversies stirred by a whistleblower’s release of internal documents about the potential harmful effects of its current products). A time when the physical and virtual worlds blend into one has never felt more possible.

To a point anyway. Teleporting into the Metaverse currently requires bulky devices that resemble inches-thick blindfolds—not something many people would be comfortable wearing while working, even from home. The hardware problem was demonstrated by Sychov’s presentation: no one else on the call was wearing a VR headset. When he said that it was “hard to explain the degree to which my brain believes that I’m here, the beauty of that sunrise,” everyone had to take his word for it. His comments that “we will have cities, maybe whole countries” developing in virtual reality where people will work full time sounded even more fantastical.

However, there is another more-grounded perspective to consider on the Metaverse’s progression from science fiction to viable business model. Igor Tishin, an Information Technology analyst at Harding Loevner, has thought a lot about the Metaverse and its implications for big technology companies—Facebook, Apple, Google, and Amazon as well as chipmakers and related equipment suppliers like NVIDIA, TSMC, and ASML—whose growth depends on continually expanding the applications of their technology. Still-evolving areas of technology like the Metaverse may be highly speculative, but these companies’ share prices already reflect an expectation that such growth opportunities will become a reality, and not in a too-distant timeframe. “A lot of people get hung up on how we’re going to get from where we are today to there,” Tishin says. By “there,” he means the Metaverse. “I’m more sanguine about the ability, and motivation, of these companies to figure it out.”

A Brief History of the Metaverse

The concept of the Metaverse has been a source of fascination, and hype, since before there was a commercial internet. Neal Stephenson originally coined the term in his 1992 novel *Snow Crash*. In the novel, considered a classic by tech professionals, users entered this original “Metaverse” via a pair of goggles onto which a 3-D world was holographically projected with a blueish beam of light. So, in 2012, when Google co-founder Sergei Brin arrived at a charity event in San Francisco wearing a pair of goggles with an eerie bluish, laser-like spot covering his right iris, it sent shockwaves through the tech industry. Within two

years, however, Google's consumer AR goggle product, Google Glass, would become the company's highest-profile failure. Other companies' stumbles have followed. Magic Leap, a much-hyped AR company, has repeatedly fallen short of its soaring ambitions to, among other things, create a humanlike virtual assistant or city-sized holographic overlay. And forecasters have continued to overshoot. In 2016, one industry group declared the market for AR and VR would reach US\$150 billion in 2020—they were off by US\$117 billion.²

Yet there is still an undeniable feeling that *something* must eventually replace the handheld screen. The exact next step for consumer tech is still up in the air, but many futurists in Silicon Valley believe it will be some combination of devices and platforms that delivers the sense of "presence" described by Sychov. To date, VR has mainly been applied to gaming. But recently tech captains have talked up VR's practical applications like remote work. In interviews, Zuckerberg has reported conducting more of his meetings via the company's new Horizon Workrooms VR platform and how helpful it is not only to meet remotely but also to share a sense of space with other people that allows a better read on body language or wheeling around to the same side of a table when working through a problem with a colleague.

At this point, anyone able to join Mark Zuckerberg in the Metaverse will be doing it as an avatar—interacting cartoon-to-cartoon, as it were. Achieving the body scanning, processing speeds, high-resolution cameras, and lens/displays capable of real-time photo-realistic image generation is an essential precondition of the next stage of the development of the Metaverse. Streaming capacity will also need to expand. In April 2020, Fortnite developer Epic Games co-produced a Travis Scott concert attended by more than 27 million avatars, all putatively beamed into the same venue in the Metaverse. In actuality, current technology can only handle a hundred or so avatars meeting at once: a technique called "sharding" is required to bring together thousands of these avatar groups to create a mostly identical and near-simultaneous communal digital experience. For billions to move about freely together in the Metaverse, the shards will somehow need to fuse.

Overcoming such hurdles is not a trivial endeavor. Nevertheless, Tishin says, "my suspicion is that we're solidly in the realm of an engineering problem as opposed to a scientific problem." The latter, like commercially viable nuclear fusion, cannot be solved without some fundamental breakthrough. With an engineering problem, the breakthroughs have already occurred, and the remaining challenges can be solved with time and money.

Next Steps

For now, the Metaverse is not a unified phenomenon, but a loose collection of devices, digital environments, and related technologies. Microsoft has spoken of its Digital Twins as an "enterprise Metaverse." Google, as it happens, never fully abandoned Google Glass. It has continued to develop and sell the eyewear for enterprise customers, including the shipper DHL, whose workers use the glasses for item picking at its warehouses.

The data and images that appear in the pickers' field of vision, too, form an emerging Metaverse. Somnium Space is clearly a Metaverse, but so is Decentraland, where, earlier this year, parcels of digital land were going for the cryptocurrency equivalent of hundreds of thousands of dollars. Some users experience Decentraland in VR, but most simply choose to use the 2-D interface of their tablet or smart phone.

There will come a time, however, when all these individual platforms will merge to form *the* Metaverse. At least, that's the vision articulated by venture capitalist Matthew Ball in a pair of widely circulated essays in May 2020 and June 2021.³ Ball elucidated some half dozen different developments (beyond the required engineering advancements) that need to occur before an all-encompassing Metaverse can be realized. One of them is a set of standard programming protocols—like HTML with which the web is built—to provide interoperability between platforms. Another is an integrated, functioning economy within the Metaverse that matches the freedom from the physical world's constraints with a system—presumably relying on some version of blockchain—that establishes immediate and immutable provenance over economic goods and services.

No one can say with precision how long it will take for these pieces to fall into place or how big the economic opportunity could be. "The entire global economy is roughly US\$84 trillion now," Tishin observes. "In 10 years, it will be way over US\$100 trillion. What percentage of that will have moved into the Metaverse? It's clearly not all of it, or probably even most of it, but if it's even one-tenth, you're talking several trillions of dollars."

During his "Ready Player One" conference presentation, Sychov tried to give a sense of how he sees the business opportunity unfolding in his corner of the Metaverse. Currently, Somnium Space generates most of its revenue from "primary" sales, including plots of virtual land as well as the commissions it charges on avatars,⁴ virtual cars, and other non-fungible tokens (NFTs). However, he projects the company's revenues will increasingly come from the cut it takes on transactions between users when they exchange goods, services, games, and even whole sub-worlds created within its platform. As the user base grows from the couple thousand avatars a month who interact inside its virtual world now, he expects advertising naturally to follow. Already, Sony has erected a pop-up shop in Somnium Space to advertise its VR headsets.

With billions of people around the world rising into the middle class or else demanding more equal access to goods, services, and lifestyles, it may be more preposterous to assume the physical world can continue housing all those hopes and desires on its own.

Sychov predicts that it won't be long before major brands catch on to the possibilities of taking things a step further. While commerce in the Metaverse at the early stages is likely to focus on virtual advertising for physical goods (a glorified extension of the internet,

in other words), the *next* stage will be a shift to advertising for and selling virtual ones.

At one level, it is a preposterous (and deeply unsettling) idea that eventually many of us will be spending so much of our time inside the Metaverse that a company like Nike, for example, could be earning a significant portion of its profits producing shoes for avatars instead of physical sneakers. Tishin, however, isn't ready to dismiss the possibility outright. "We've already seen with these concerts how some types of experiences could be just as good, if not better, experienced in the Metaverse. Travel could be another. Theme parks. The thrill of driving a really fast car. So, you're likely to see the virtual economies working in parallel with the real ones." There are important environmental and societal implications to what he is saying. With billions of people around the world rising into the middle class or else demanding more equal access to goods, services, and lifestyles, it may be more preposterous to assume the physical world can continue housing all those hopes and desires on its own.

Modeling the Metaverse

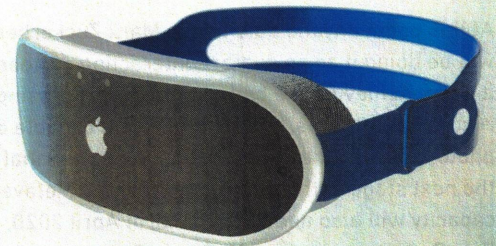
Of course, for the Metaverse to become the grand parallel economy Tishin describes, the devices will need to be so capable that, like smartphones today, they become essential tools to most consumers. Companies, meanwhile, will need to demonstrate the power of the platforms so they can attract developers to build experiences that draw in customers. As Tishin points out, the incipient Metaverse is at a common juncture in the development of new technology. Software like Netscape and Internet Explorer had to be written and proven useful for web browsing before they triggered the content explosion upon which our current 2-D internet is based. Amazon had to spend vast sums making the Kindle into a capable device before publishers took e-books seriously. Once they did, Amazon was able to cash in on the real prize, which was selling e-book content, not Kindles.

The history of technological development is important context for assessing the value of tech companies. Investors generally value companies based on projections for the rate of growth of their current businesses, but valuing tech companies also involves trying to get a financial handle on just this process: the future rewards that will come to those companies that succeed in exploiting totally new platform paradigms.

According to Tishin, two of the Metaverse's biggest winners will likely be Facebook and Apple. Compared to Facebook, Apple has been relatively silent about its plans, "which suggests how serious they are," says Tishin. Apple is the one company with the expertise and control over the entire technology stack to solve the engineering challenges in creating a viable Metaverse. The company has powerful, well-designed proprietary hardware, from chips to the devices themselves. These devices, running on Apple's own operating system, form an ecosystem with over one billion users. And Apple has a straightforward business model for the Metaverse: to replicate in 3-D the experience of using an iPhone.

Tishin estimates what the impact of the Metaverse should be on Apple's valuation by starting with the iPhone. Today, the iPhone alone generates about US\$200 billion in revenue annually. In Tishin's valuation model, he projects that in five years Apple will have an additional business selling goggles and glasses with AR/VR augmentation whose revenues will be just short of what the iPhone generates today—call it US\$150 billion a year. To back the impact of that new business into his current estimation of Apple's fair value, Tishin multiplies US\$150 billion by Apple's 37% gross margins, then multiplies that number by 10 (a conservative stock price multiple), and then again by his ballpark 75% probability that the whole effort actually materializes. When he divides *that* number (US\$416 billion) by Apple's 16.5 billion outstanding shares, he comes up with an added value from the hardware for accessing the Metaverse of US\$25 per share by mid-decade. That's one reason that Apple's recent share price of around US\$140 a share, at 28 times trailing earnings, actually strikes Tishin as pretty reasonable, even with the potential for some cannibalization of its existing hardware business.

Apple VIEW

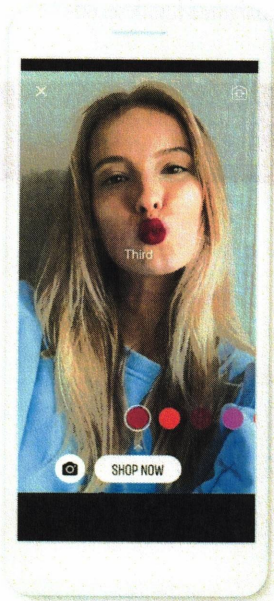


Source: Antonio DeRosa (aderosa.myportfolio.com).

An artist's rendering of Apple's planned VR/AR headset based on leaked documents and insider reports. It reportedly will hit the market in 2022 at a price of US\$3,000. That compares to US\$300 for the bulkier Facebook Oculus, suggesting the device will largely be used as a proving ground for even sleeker glasses. For its part, the company has only acknowledged it's working on both projects.

Modeling the value of Facebook's future in the Metaverse is a little more complicated. In a recent earnings call, Zuckerberg suggested that the company will spend over US\$10 billion on Metaverse development in 2021. The only significant revenue those efforts are generating so far (annualized at US\$3 billion in sales) is from its Oculus headset, widely regarded as the leading VR gadget on the market. In partnership with Ray-Ban, Facebook also recently unveiled its "smart glasses," which are presently only smart enough to take photos, record videos, play music, and answer phone calls, but according to Facebook could soon deliver on some rudimentary aspects of the Metaverse in a stylish, user-friendly form factor. Zuckerberg has been careful to note, though, that none of the new hardware will necessarily change the way the company earns its profits—through advertising.

For a glimpse of how the company's future advertising profits may play out, Facebook insiders have directed Tishin to Facebook Shops. This initiative, launched in partnership with the e-commerce platform Shopify, is Facebook's attempt to build a marketplace that can rival Amazon, particularly for the new mode of "inspirational" shopping that is driven by social interactions and recommendations from friends. The Shops platform lets you use your phone's video function to view a selfie of your face and "try on" a shade of lipstick that's caught your eye to see how it looks with your skin tone. The company envisions a time when the lipstick—or your old college roommates, or your dermatologist—will appear with a simple wave of everyone's wrist. In any event, all are more value-added ways to pull people into the company's orbit so it can keep serving them ads.



Source: Facebook.

AR lipstick on Facebook shops.

So how much is the Metaverse potentially worth to Facebook? Applying the same logic that he does to Apple—that in time the company will have a separate Metaverse-related business comparable to the size of its core business today—and accounting for a similar level of cannibalization, Tishin figures that in five years Facebook could be generating 50% more in ad revenues than it would be without the Metaverse. But he also thinks Facebook may be playing down the full scope of its monetization plans. "What if its platform becomes one of the main places where hundreds of millions of people around the planet are working, buying virtual tennis shoes, spending the afternoon in Paris. Wouldn't it want to start taking a cut of developers' revenue for bringing those experiences to people? In which case, the revenue opportunity could increase by an order of magnitude."

This raises the question of why Facebook would spend time and money fiddling around with headsets. Although Facebook pulls in a

fraction of Apple's top line, its gross profit margins, which top 80%, dwarf those of its Cupertino rival. And Apple is the most efficient hardware maker in the world. But, Tishin says, Facebook could face a problem. If Apple does succeed in building the world's best Metaverse hardware and operating system, it could also be able to set the fee structure for those who want to use its enabling platform.

Apple's track record in that area can't give Zuckerberg much peace of mind. The up to 30% commissions Apple charges on sales in its App Store have long been decried by developers as usurious. Recent concessions to app developers and a September court decision in a lawsuit by Epic Games suggest that Apple's commission policies may be on the wane. But Apple has found a clever way both to deflect attention from its usurious practices and to create an alternative source of revenue: supporting the push for greater privacy protections. The safeguards it has implemented to prevent the data of iPhone users' from being shared with third-party advertisers have severely crimped the ability of Facebook and Google to serve those users ads, effectively siphoning a not-insignificant portion of ad revenue to ... Apple. "I don't think every company is going to have exactly the same vision here," Zuckerberg said recently, clearly a veiled reference to the potential for Apple's current walled garden to carry over into the Metaverse. "I think some are going to have more siloed visions, and I, at least, believe that in order for this to work really well, you want it to be very portable and interconnected."

Tishin sees Facebook's hardware efforts (and the implicit threat that it could build out its own operating ecosystem that competes directly with Apple's future Metaverse i-wearables business) as chiefly a form of leverage. "I could easily see Zuckerberg going to Apple CEO Tim Cook at some point and saying, 'Look, we don't want to keep making headsets and sunglasses, we'd much rather stick to selling ads, but you need to give us a break on the cut *you* take from people and businesses having entered the Metaverse through your wormhole.'"

As Tishin watches the Big Tech players arming themselves with the technology and strategies they believe will help them win, he is reminded of massively multiplayer online games (which, by the way, would be awesome inside the Metaverse). "All those warriors show up for the ultimate battle and, at first, there's 2,000 of them. But then when it's down to, like, six, they have to say to one another: Let's stop. We can have a really nice life if we compromise instead of try to fight."

Contributors

Analyst Igor Tishin contributed research and viewpoints to this piece.

Endnotes

¹Where VR refers to a wholly virtual experience, AR involves the layering of the virtual atop the physical.

²"Augmented Reality Market Size, Share & Trends Analysis Report by Component, by Display (HMD & Smart Glass, HUD, Handheld Devices), by Application, By Region, and Segment Forecasts, 2021-2028," Grand View Research, February 2021.

³"The Epic Games Primer: Parts I-VI Directory" (May 22, 2020); "The Metaverse Primer" (June 29, 2021), MathewBall.vc.

⁴Artur Sychov reports having paid a creator US\$2,000 for his avatar.

Disclosures

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