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Preface

I am a Columbia Business School second year MBA student graduating in May 2023. For my summer 2022 MBA internship, I worked at PlayStation Studios on a team where I focused on Metaverse Strategy.

At PlayStation, I (i) analyzed possible uses of the company's gaming technology and core competencies in the metaverse, (ii) conducted a competitive analysis of all of the major players in the metaverse arena looking at their strategy and capabilities, and (iii) participated in analyzing future acquisitions in the metaverse space.

I returned to Columbia with a passion for the emerging technology, AI, and gaming. I took a class with Sharad Devarajan on Virtual Reality and Artificial Intelligence and knew I wanted to further study the space. I wanted to delve deeper by getting personal perspectives on what companies are doing in the space and how they view the metaverse and the evolution of relevant technology. I hope this paper helps others to gain perspective on metaverse potential and how it will transform society. Set out below is a comprehensive compilation of interviews I conducted this semester, with top technology executives and thought leaders at some of the most significant technology, gaming, entertainment, and adjacent companies in the space, supplemented by research I found from publicly available information.

This report includes interviews I conducted with the following leaders.

50+ others I interviewed were not able to speak on the record, due to PR reasons.

Michael McHale: Director of Product at Roblox
Jonathan Stringfield, PhD VP, Global Business Research and Marketing at Activision Blizzard
Isaac Sundsted Senior Business Development Manager, Gaming & Metaverse at Microsoft
Yoav Shapira Director of Engineering at Meta
Dave Rhodes Senior Vice President and General Manager, Digital Twins at Unity
Richard G. Kerris Vice President of Omniverse Developer Platform at NVIDIA
Kevin Robertson Director, Business Development at Tencent
Yusuf Goolamabbas Chief Technology Officer at Animoca Brands
Rich Robinson Entrepreneur in Residence at Animoca Brands
John W. Osvald President of Games at Gala Games
Vicki Dobbs Beck VP of Immersive Content at Lucasfilm and ILMxLAB
Doug Rosen SVP of Games and Emerging Media Paramount
Joanna Popper Chief Metaverse Officer at Creative Artists Agency
Josh Hackbarth SVP/Head of NFT Commercial Development and Animation Franchise Warner Bros. Discovery
Victor Pineiro Director of Digital Innovation HBO
Samantha Garrison Senior Manager, Digital Innovation HBO
Diana Williams CEO and Co-Founder Kinetic Energy Entertainment

Rama Harihara Principal Engineer (AI) at Intel Corporation
Brian Trunzo Metaverse Lead at Polygon Studios
Yonatan Raz-Fridman Founder and CEO of Supersocial
Matthew Kanterman, CFA Director of Research of Ball Metaverse Research Partners
Daniell Phillips Executive Producer focused on Immersive Experiences at BUCK
Christine Cattano Former Head of Immersive at Framestore-Now with Accenture's Metaverse Continuum Business Group (Metaverse Studio Lighthouse Client Strategy Lead)
Nanea Reeves CEO and Co-Founder of TRIPP
Liv Erickson Senior Manager, Hubs Lead at Mozilla

Introduction

The metaverse is the convergence of our physical and digital lives. As technology advances it will revolutionize society in ways we can only try to imagine today. As the technology evolves experiences will become more immersive and interactions with the digital world will feel human. One definition that resonates is that the metaverse is the "next iteration of the internet," Another way to describe it is the "next iteration of technology."

While a core group of technology companies have a potential foothold in the space, dozens of other companies are emerging as fierce competitors. How will the metaverse take hold of society and who will build it? Will one company monopolize the entire industry or will it be built by hundreds of companies? With gaming companies at the forefront of conversations regarding the metaverse today, one can only help but wonder if it will be a Unity or an Epic (with their Unreal engine) who will build the underlying infrastructure of the metaverse. Or will it be a company like NVIDIA with their Omniverse platform, that will potentially revolutionize enterprises and bleed into other sectors like entertainment? How can a company like Warner Brothers Discovery, whose competitive advantage in the space is IP and not infrastructure technology, fight their way into the conversation?

How do we create an ethics driven metaverse? With technology advancing, and companies being at the forefront of user owned data, how can we protect ourselves? How can companies use data in an ethical manner? Who do we want to own our data? Does it matter? Do we have a choice? It feels like people have no choice now to live without a phone, and very little choice of what type of phone to have. Will it be the same in the metaverse?

How will brands work in the metaverse? With the advancement of AI, what happens when you can't tell anymore what is real and what is not? When the lines between digital and physical are blurred, do corporations have the power, or do people? All questions that will be answered over the upcoming decades.

You will see in the interviews that everyone views the metaverse differently. Some think metaverse is almost synonymous with blockchain and decentralization, and some believe there will be a few major players in the space that end up dominating it. Some believe there is just one metaverse, "the internet," while others think there are many metaverses. Some believe the metaverse is here and some believe we are a decade away from reaching its real onset. Regardless, my hope is that you come away with a better understanding of the different perspectives of the way people view metaverse and knowledge for how they strategize about its development.

We do want to note that no one is speaking on behalf of their company, and the opinions set out by the participants are their own. It is, however, interesting to see how different people at different companies view the Metaverse and larger ecosystem. Some company sections are more research heavy and some are more interview heavy, depending on the nature and content of the interview and who was able to speak on or off the record. Some interviews are more focused on the company, and some are more focused on the metaverse in general, to give the reader a 360 degree view on all things metaverse.

Roblox
Michael McHale
Director of Product
Michael is not speaking on behalf of Roblox. These are personal opinions only.

Roblox has been a leading player in the metaverse space and is at the forefront of conversations surrounding the topic. Roblox saw a boom during Covid and hit a peak of 202 million monthly active users in April of 2021.[1] According to November 2022 metrics "daily active users were 58.8 million, up 24% year over year" and "hours engaged were 13.4 billion, up 20% year over year"[2]

Roblox benefits from the fact that kids make games themselves. According to the CEO, David Baszucki, they want "everyone on Roblox to build things…as building is what differentiates our platform."[3] There are strong network effects that bring in more users, more content, more experiences, and more games. With millions of games and an unmatched number of experiences, Roblox is known for its variety of content and short-form games. It stands in stark contrast to a gaming company like PlayStation whose competitive advantage is their narrative storytelling and long form games. According to Baszucki, their "whole company is really focused on the innovation to drive and shepherd this vision of what some people call the metaverse-or co-experience-forward."[4]

I spoke with Michael McHale, Director of Product at Roblox. He works to enable creators to make more interesting content. He thinks Roblox is interesting because the company has had a unique path and a CEO with a unique vision. From the get-go, the idea was to be able to create things and share them with other people, and eventually address many different platforms. They removed requirements with how you interact and connect with the platform and instituted a unique multi-platform strategy.

As a platform, they have a core proprietary engine. It is highly social. You can quickly jump around and try things with your friends. Michael says "it became highly viral, because it's more fun to go through experiences with your friends. Players have unique experiences that emerge from the social interactions and user generated content coupled with the underlying

[1] *Roblox User and growth stats 2022*. Backlinko. (2022, October 10). Retrieved November 4, 2022, from https://backlinko.com/roblox-users
[2] *Roblox reports third quarter 2022 financial results*. Roblox. (n.d.). Retrieved November 15, 2022, from https://ir.roblox.com/news/news-details/2022/Roblox-Reports-Third-Quarter-2022-Financial-Results/default.aspx
[3] Sims, T. (2013, February 7). *Interview with David Baszucki, Founder & CEO of Roblox*. Wired. Retrieved November 4, 2022, from https://www.wired.com/2013/02/roblox/
[4] Kevin_Stank. (2021, November 10). *Roblox founder and CEO: Our business plan 17 years ago predicted the rise of Metaverse*. CNBC. Retrieved November 4, 2022, from https://www.cnbc.com/2021/11/09/roblox-founder-and-ceo-our-business-plan-17-years-ago-predicted-the-rise-of-metaverse.html

simulation. It was lightning in a bottle. At some point the company added monetization so people could make a living out of making content."

Michael believes "the most interesting thing about (the metaverse) is the difference between going to a website and a 2D interface versus exploring a 3D world where you potentially have social interaction and an identity that you can bring with you. Roblox lets you customize your identity and carry it with you through any experience."

As far as identity goes, people spend a lot of time on their identity on Roblox. "Roblox daily active users spend an average of 2.6 hours per day on the platform."[5] Michael believes one of the key things Roblox offers is flexibility, allowing people to "mix and match with layered clothing in order to craft a unique outfit, opening up exciting opportunities for fashion on the platform." Michael notes that "Roblox is also launching animated faces, which will allow players to further express themselves through their avatar, when interacting with other players." He says that "people use 3D avatar identities to communicate different aspects of their personality." The Roblox update means "users could smile, wink, or scrunch their forehead, and their avatar would mimic them in real time. Eyes could scan, heads could shake, and eyebrows and ears could wiggle with the same results."[6] Michael thinks about real world identity, your social network identity (crafted versions on Facebook or Instagram) and your virtual world identity (3D avatar).

They have a lot of brands coming on the platform that are interested in creating experiences. Recently, Walmart created an experience in Roblox with "Walmart Land" and "Walmart's Universe of Play."[7] They have an amazing demographic of users that are hard to reach. Michael believes the key thing is engaging content, which he believes is true of any form of entertainment.

Microsoft and Activision Blizzard

It goes without saying that Microsoft is a major player in the metaverse and technology space. Judson Althoff, EVP and Chief Commercial Officer at Microsoft, has differentiated between three different metaverses--which include the consumer side of the metaverse (Xbox/gaming/opportunity inside of VR world creation from an entertainment consumer perspective), the commercial side (hybrid and modern work practices) and the industrial side (IOT/integration of sensors/digital twins/using AI machine learning to optimize efficiency).[8]

According to Research Methodologies, Microsoft's "Intelligent cloud represents one of the solid sources of Microsoft competitive advantage and Microsoft business strategy places a great emphasis on the cloud segment of the business." [9]The second strategy is growing through mergers and acquisitions. The third is focusing on VR and AR.

[5] *Roblox User and growth stats 2022*. Backlinko. (2022, October 10). Retrieved November 4, 2022, from https://backlinko.com/roblox-users

[6] Basu, T. (2022, September 13). *Roblox's avatars are about to get more expressive*. MIT Technology Review. Retrieved November 4, 2022, from https://www.technologyreview.com/2022/09/09/1059135/robloxs-avatars-are-about-to-get-more-expressive/

[7] melissa_repko. (2022, September 26). *Walmart enters the metaverse with Roblox experiences aimed at younger shoppers*. CNBC. Retrieved November 4, 2022, from https://www.cnbc.com/2022/09/26/walmart-enters-the-metaverse-with-roblox.html

[8] YouTube. (2022, October 19). *The industrial metaverse*. YouTube. Retrieved November 7, 2022, from https://www.youtube.com/watch?v=oo16phgcALQ

[9] "Microsoft Business Strategy and Competitive Advantage - Research-Methodology." *Research*, 29 Jan. 2019, research-methodology.net/microsoft-business-strategy-and-competitive-advantage/.

Forbes notes that “Microsoft has a large user base across multiple platforms which, when combined, give the company a large moat.” [10] These platforms include Microsoft 365, Microsoft Teams, LinkedIn, and Windows 10. Microsoft recently announced a partnership with Meta Quest Pro.

Microsoft has sought to acquire Activision Blizzard for $68.7 billion – a deal that is still under regulatory review.[11] Other companies they’ve acquired in the space have included ZeniMax Media ($7.5 billion) and Mojang, which owns Minecraft ($2.5 billion).[12]

In 2021 CEO Satya Nadella said that “As the virtual and physical worlds converge, the metaverse…is emerging as a first-class platform.” Microsoft’s gaming communities, like “Minecraft” and its 140 million monthly users, could grow into huge commercial marketplaces “as games evolve into metaverse economies.” [13]

Microsoft appears to have a dual strategy of winning in the gaming space and revolutionizing work with Microsoft Mesh, an MR device. Microsoft has indicated that “Microsoft Mesh will also enable geographically distributed teams to have more collaborative meetings, conduct virtual design sessions, assist others, learn together and host virtual social meetups.” (Microsoft)

Activision Blizzard
Jonathan Stringfield, PHD
VP, Global Business Research and Marketing
Jonathan is not speaking on behalf of Activision Blizzard, these are personal opinions only

Jonathan Stringfield, PHD, VP of Global Business Research and Marketing is a big proponent of separating “Web3 from Metaverse for a number of reasons.” He notes that “they get conflated because they are both ideas that talk about the future of the internet. But if you look at them at their most basic level, they are very fundamentally different in terms of the technology or user experience. Metaverse is essentially the service layer for the user and Web3 is basically a foundation or a movement to use blockchain technologies for the infrastructure of the internet. There is a world in which blockchain based infrastructure takes off and the metaverse never does. They don’t have anything in common on a philosophical level.”

With regard to gaming, he says “You’re seeing the biggest groundswell of interest from users in the business community on the gaming side, because there is a reason those worlds exist. They all are excelling at fulfilling some sort of basic human need. The pitfall of non-gaming based virtual worlds is that they are just kind of there. There is a lot of “if you build it, they will come” mentality to it. But you’re not really fulfilling any need. People will adopt technology to the extent it fulfills something valuable in their life. What we’re finding is that gaming organizations are leading the way. I believe for the most part that gaming companies will be the most influential in this space because they have the expertise and are very good at fulfilling

[10] Trainer, David. “Microsoft's Incumbent Advantage Creates a Large Moat.” *Forbes*, Forbes Magazine, 21 Apr. 2022, www.forbes.com/sites/greatspeculations/2021/11/15/microsofts-incumbent-advantage-creates-a-large-moat/?sh=13dd391e65a8.

[11] Jr., Tom Huddleston. “Microsoft's Metaverse Plans Are Getting Clearer with Its $68.7 Billion Activision Acquisition.” *CNBC*, CNBC, 19 Jan. 2022, www.cnbc.com/2022/01/19/microsoft-activision-what-satya-nadella-has-said-about-the-metaverse.html.

[12] “”

[13] “”

human needs." He adds that "In terms of having the tools to build the metaverse--it is the gaming sector to lose."

Isaac Sundsted
Senior Business Development Manager, Gaming & Metaverse
Microsoft
Isaac is not speaking on behalf of Microsoft—these are personal opinions only.

Isaac Sundsted, Senior Business Development Manager (Gaming and Metaverse) at Microsoft says that "we want to bring technology to market that brings joy to our gamers--technology which serves to make us more productive or more connected with the people around us. On the people's side of things, we have a real opportunity to expand the way that we are able to take our friends between experiences--where we are able to maintain better human connection. That's where I think the value is around this technology—better human connection, which means that we can all do more-- which is ultimately the Microsoft mission. We have a corporate culture and are driven by that mission. Culture is not a byproduct at our company. Our mission statement, 'Empower every person and every organization on the planet to achieve more' is core to what we do. I can trust that everyone here is working in the same direction." He sees the metaverse "as the ongoing digitization of life. People, process, things."

Meta
Yoav Shapira
Director of Engineering
Yoav is not speaking on behalf of Meta. These are personal opinions only.

Meta recently unveiled the Meta Connect Pro VR headset that sells for $1499.99, aimed at business customers and enterprise applications. This is a strategic pivot from their consumer focused Meta Quest 2. They recently increased the price of the Meta Quest 2 from $299 to $399. The associated press release stated that by "adjusting the price of Quest 2, (they) can continue to grow our investment in groundbreaking research and new product development."[14]

They have new partnerships with "Microsoft, Adobe, Zoom, and others."[15] They also announced a partnership with Accenture which is "a deal which will bring Autodesk's 3D modeling technology to the Meta Quest Pro" and NBCUniversal, where "Meta will deploy its Quest and Quest Pro headsets at Universal Studios parks to create VR-based experiences using NBCUniversal properties such as The Office." [16] Some other updates include Avatars getting legs, virtual white boards, new features for Workrooms, Xbox cloud gaming coming to the Quest Store, and new games, like *Among Us VR* and Marvel's *Iron Man* VR". [17]

[14] "Meta Quest 2 Pricing Changes, 'Beat Saber' Included for a Limited Time." *Meta Quest VR Headsets, Accessories & Equipment*, 26 July 2022, www.oculus.com/blog/meta-quest-2-pricing-changes/.
[15] Gariffo, Michael. "Everything Meta Just Revealed at Its Meta Connect 2022 Event." *ZDNET*, 11 Oct. 2022, www.zdnet.com/article/everything-meta-just-revealed-at-its-meta-connect-2022-event/.
[16] Gariffo, Michael. "Everything Meta Just Revealed at Its Meta Connect 2022 Event." *ZDNET*, 11 Oct. 2022, www.zdnet.com/article/everything-meta-just-revealed-at-its-meta-connect-2022-event/.
[17] Plant, Logan. "Meta Connect 2022: Everything Announced." *IGN*, IGN, 11 Oct. 2022, www.ign.com/articles/meta-connect-2022-everything-announced.

I spoke with Yoav Shapira, Director of Engineering at Meta about his experience and views on the space. The reason Yoav switched his career to the Metaverse segment was "because VR/AR could be the next big thing in technology and the opportunity to work on it from the early days is very appealing." He added that "the startup guy in me loves that. The other reason is that it's kind of like a startup. It's a new product. It's a nascent product in a nascent technology stack, so the opportunities for innovation and research are very exciting. I like to build new products and I like 0-1 work."

Yoav noted that he works on Horizon Worlds which is a next generation social network that is synchronous and immersive. He stated that "we're looking for what use cases or scenarios are enabled by these technologies that people value. I'll give you an example. My family is in Israel. Wouldn't it be awesome to go to the same temple service regardless of where you were in the world? Turns out you can in the metaverse. You can hear the same speaker and prayers. We're looking at things like that which are social, which bring people together, which create communities, which are either impossible to do in the real world or just really hard--these are better ways to do them."

He asks, "What sort of lessons can you learn from our other products and other companies' products?" He says that "for example, we've worked on making it safe and age appropriate from the beginning. In the metaverse, it translates into these superpowers because the solutions you can have are really cool. One of the things that happens in the metaverse because it's a social network is that people crowd your avatar. It's this weird feeling. In the metaverse, we just built this thing called 'personal boundary' which is on by default and you can control its size. It is basically an invisible sphere around you that no one can get into and you can set it so only people you follow can go into that sphere. That's a feature that doesn't apply to 2D apps. You also can't do it in the real world. It's an improvement to the real world. We're very interested in things like that to improve safety and behavior.''

He says "another example is we built a feature called "voice modes" because another form of abuse is people can yell at you in the metaverse – it's so immersive and there is spatial audio. It can be distracting and offensive. What can you do about it? In the metaverse you can just mute them. You can, by default, only hear audio from people you know. It's kind of like this superpower you can have. We're very interested in using technology to give people control over the experience in ways that aren't possible in real life."

In regard to technological barriers, he says "the Quest team has been making wonderful progress on some of the hardest problems with the headsets, like rendering a high enough fidelity graphics so that your brain feels like it is immersed and convincing. I don't work on it but I'm impressed by it. That's many years of work. Getting it in a form factor that is comfortable where you can wear it for a while is super hard. It has to be light and can't run hot, all those things really hard. They have to keep getting better. The next set of barriers are the CPU and GPU capacity on those devices (the chips they have are really powerful) but they are not powerful enough for 4K by 4K resolution of very rich environments. If you look at some of the environments in video games today on desktops, they're amazing. They're really photorealistic. Unreal and Unity are the two best engines and we appreciate both of them. There will be a day (years away) where you can render full Unreal or Unity scenes on a headset and that is a game changer because they look like any amazing photo you've seen."

Unity
Dave Rhodes
Senior Vice President and General Manager, Digital Twins
Dave is not speaking on behalf of Unity—these are personal opinions only.

Unity is a leader in "real-time 3D technology."[18] Dave Rhodes runs Unity's Digital Twin business (the business beyond the games industry). He is responsible for product, engineering, go to market, and everything beyond gaming. His version of the metaverse is a "real time 3D version of what today we call the internet or the World Wide Web." He says, "the internet as we know it today is largely still 2D in nature and the number and type of 3D experiences are relatively limited." It's less for him about a single destination or a rebrand of what today is the internet and more about the underlying elements that characterize our digital experiences.

How do we get to this 3D interactive world? According to Dave, "a couple things need to happen to proliferate and accelerate it. Over the last 3 years, fundamental infrastructure technology has continued to advance to make real time 3D experiences more accessible and democratized." In regard to technology advancing, he notes some considerations:

1. We need the availability of cloud based GPU and CPU computing in a way where much of the computing power can take place in a farm in a way that is cost effective, so you don't have to run the experiences on your end point.
2. Both wired and wireless networking bandwidth speeds have continued to speed up and that is really important, particularly in more remote areas where not everyone has the iPhone 14. They might have older technology. The ability through high performance networking to stream interactive experiences that are hyper realistic and render mass amounts of pixels is important.
3. We need the ability to use AI and machine learning in a practical way to change the nature of these experiences. Today the 2D internet is asynchronous and there is latency involved in the response. A fundamental characteristic around the digital experiences is that they run in real time. Machine learning is necessary to make that experience personal to you in a way that you stay engaged and that is high utility, high value. There is an infrastructure layer of technology that needs to advance, so that you have the same chance as someone in a developing country to interact on an equal playing field.
4. These endpoint devices need to evolve to lower price points so that access to glasses and high-performance devices and tablets are democratized.
5. Unity was forged in the video game industry. They started out building a game engine (the tools a game developer needs to develop a great game). The idea was to make it easy for the little guy to punch in the same way as a global company. They invested heavily in the concept of enabling developers to create the experience once and publish it broadly.
6. Most people that want to develop a video game would love to make money publishing their game. The two things they made sure they did were, (i) enable developers to create on a massive number of different end point platforms, and (ii) build a

[18] "Road to the Metaverse." *Unity*, create.unity.com/road-to-metaverse.

monetization network (second largest mobile monetization network in the world) that enables developers to take their free to play video games and publish them.

Unity created potential technological barriers to entry and unique capabilities which will be beneficial to it as the metaverse becomes real. These elements were evident in the video game industry six years ago (highly synchronous, hyper realistic real time rendering, interaction at scale, support for headsets and social media platforms). Dave says they “built up a business beyond the gaming industry now in manufacturing, healthcare, film/tv production, all on the basis of the fundamental capabilities of the real time 3D. Their core competitive advantage in the game industry has given them a foundational lead.”

Dave added that “what the pandemic brought was isolation, the inability for two people to sit down and collaborate in person, and an acceleration of our comfort level with digital experiences being the way we socialize—so we adapted to it and made it functional. Over the two year period, the infrastructure of technology capability has continued to advance.”

NVIDIA
Richard Kerris
Vice President of Omniverse Developer Platform
Richard is not speaking on behalf of NVIDIA. These are personal opinions only.

NVIDIA makes Graphics Processing Units (GPUs) that create “photoreal physically accurate simulations powered by AI technologies.” [19] They enable developers to make “metaverse applications, connect 3D tools, and build digital twins using their platform, Omniverse.”[20] They recently launched “Omniverse cloud services for building and operating industrial metaverse applications.” [21] I spoke with Richard Kerris, Vice President of Omniverse Developer Platform at NVIDIA on his views on the Metaverse.

Richard defines the metaverse as “next evolution of the internet -- a 3D centric internet.” He says that “as the metaverse becomes 3D centric, you’ll be able to have an experience based relationship with what you do on the internet. It does not mean everyone is *Ready Player One* or floating avatars. The key is consistency between virtual worlds, so that I don’t have to load special software to have a 3D experience of one site and then load a different type of software to experience 3D on another site. It is the next generation of the internet.” He refers to NVIDIA’s strategy as “focused on the industrial version of the Metaverse; digital twins, virtual experiences, product development, and manufacturing.” They see digital twins as a “thread that connects operations across many different industries. They are creating the “platform called Omniverse that allows connection of existing tools into a consistent 3D environment for collaboration and simulation.”

They are already transforming enterprises. Richard sees “everything as having a digital twin (warehouse, factory, product, digital twin of earth” and believes it will impact all industries from manufacturing to education to healthcare. The biggest thing is as we “move everything to the cloud, it will make digital twins even more accessible.”

[19] “World Leader in Artificial Intelligence Computing.” *NVIDIA*, www.nvidia.com/en-us/.
[20] “Omniverse Platform for Virtual Collaboration.” *NVIDIA*, www.nvidia.com/en-us/omniverse/.
[21] “NVIDIA Omniverse Cloud.” *NVIDIA*, nvidianews.nvidia.com/news/nvidia-launches-omniverse-cloud-services-for-building-and-operating-industrial-metaverse-applications.

In an interview on the Metaverse Podcast by Touch Cast Richard said, “anything that will be built will be visualized, anything that moves will be autonomous, and anything that’s autonomous will be simulated.” Elaborating here, he says “before you physically manufacture something, you will thoroughly visualize a true to reality exact replica.” It means you can test use cases that will result in cost savings in development. Before people build chips, they will be able to simulate it, in order to save cost in the real world. He says, “the more you can simulate it, the better you will be.”

As far as robots go, he says “robots are more and more impacting consumers to business,” as they are safer, more efficient, and they cut costs. In a digital twin scenario, you can have digital twins of robots and can train hundreds of AI robots in a digital environment. He believes this will be much safer and more efficient.

He believes that digital twins allow for better training of autonomous vehicles, stating that you can “use AI to give them hundreds of thousands of scenarios and a car can learn synthetically. The more you can train it, the more likely it can respond effectively.” He believes there is only one metaverse, “the internet,” emphasizing that companies learned from the dot-com crash that you can’t try and wall off something. Each company, for example, supports USB. All companies will “have their products or services in a virtual environment but they will not be prevented from going from one to another.”

On competition, he says that “the beauty of our platform is that it is open to all developers. We built it to connect to all software, everywhere. We build the platform and the software to enable scalability. All types of workflows can connect to Omniverse which allows them to enhance their workflows with the latest AI technologies.” He has an optimistic view of the metaverse, believing that the more people can work together to understand each other, the less divisions there will be. He thinks that “within 5 years, it will be a seamless part of our lives as much as the web is today. It is happening quickly, and the internet was the same way.”

Tencent
Kevin Robertson
Director, Business Development
Kevin is not speaking on behalf of Tencent, these are personal opinions only.

Tencent “is a Chinese technology company that provides messaging services, social networks on the Internet, online media, Internet value-added services, multiplayer online games (MMO, MMORPG), e-commerce and online advertising.”[22] Tencent’s market cap in October 2022 was 289.1 Billion.[23] Tencent recently formed an extended reality unit.[24] The Unit is “tasked with building up the extended reality business for Tencent including both software and hardware.”[25]

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[22] “Tencent (TCEHY) - Market Capitalization.” *CompaniesMarketCap.com - Companies Ranked by Market Capitalization*, companiesmarketcap.com/tencent/marketcap/.

[23] “Tencent Holdings Limited (TCEHY) Stock Price, News, Quote & History.” *Yahoo! Finance*, Yahoo!, 24 Oct. 2022, finance.yahoo.com/quote/TCEHY/?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAFOrCvnm-WA6XXxco0cpLPFyXPaSvzf0THIEDoxVKZbPg_Qd3ph7swK4MfPTOBC0O02AGmvNKmuXRLdWPMXfj7X6flGxyoQiqZMnfP0RooaZnYhh11B-1K-tZdusZooY6JmVGS_ZJ2Z1-cnWAtEDZkYflsuXPFh952b3_yPxaJBh.

[24] Person, and Yingzhi Yang Josh Ye. “Tencent Forms 'Extended Reality' Unit as Metaverse Race Gathers Steam.” *Reuters*, Thomson Reuters, 21 June 2022, www.reuters.com/world/china/tencent-forms-extended-reality-unit-metaverse-race-gathers-steam-sources-2022-06-20/.

[25] Person, and Yingzhi Yang Josh Ye. “Tencent Forms 'Extended Reality' Unit as Metaverse Race Gathers Steam.” *Reuters*, Thomson Reuters, 21 June 2022, www.reuters.com/world/china/tencent-forms-extended-reality-unit-metaverse-race-gathers-steam-sources-2022-06-20/.

According to SP Global, “China is undoubtedly an attractive space to build metaverses, with its total addressable market pegged at around $8 trillion, according to a 2022 Morgan Stanley report. On the other hand, with digital currencies banned in China and ongoing gaming and censorship regulation, the metaverse may face limitations.”[26] They note that Tencent has multiple competitive advantages including “hefty cash balance, a leading position in the local gaming industry, a vast social network, and financial technology services that include a payment platform.”[27]

Steven Ma, SVP of Tencent wrote that the company is “taking a more practical view of the ‘next big thing’ and its impact on online gaming.” We think “the metaverse is how some imagine our next-generation internet. In the gaming world, we are seeing a number of changes in player behavior. Due to the pandemic, people around the world are getting accustomed to using online services to solve real-world problems and communicate with friends or family members.” As they spend more time online, “people begin to imagine how our lives can be more closely integrated with the internet and whether the metaverse has great potential.”[28]He notes there will be an upgrade in user experience and content.

I spoke with Kevin Robertson, Director of Business Development at Tencent. His group “invests, acquires, publishes, or finances games or game teams.” Kevin adds that “It is framed in what the future is and what our definition is of the future and how this piece sits into that strategy.”

Kevin stated that on the speed of metaverse uptake and development, “I’ve had trouble with it because I feel like it’s slow to get there. When people think Metaverse they think Ready Player One or something that is just everyday complete ubiquity around immersion. I question if that will ever really happen.”

With respect to AR/VR, he says “this is public knowledge that Tencent is looking to get into VR and AR-- XR in general. We acquired a hardware company in China. It’s a step forward more around different platforms being lenses into game worlds. My perspective is that the metaverse in what the VR realm has defined it as, attaching Web3 to it, being on the ledgers, having your identity—we’ve already been doing that 100 times over--starting with Save Games on Nintendo. These slow incremental steps are leading towards how we interface with computers as humans and how we use computers to interface with each other.”

We talked about the role of gaming and he noted, “if you go back to the 60’s, it has always been games that have been at the forefront of that computer interfacing. What has pushed the interaction of computer devices has been games. But how we define it to the general public (we as the people that are trying to build things for interaction with the virtual worlds) has been a slow process and it’s not something you can just jump into and ‘have the metaverse.’ That’s really far away.” He added that “if things were really going to go linear, Fortnite would have just kept going and kids would have kept using that as their social media. Fortnite would have evolved to be more than these random events. Really it is just a game and

[26] Boghani, Priyanka. “Tencent Poised to Lead China's Charge into the Metaverse.” *S&P Global*, 17 Mar. 2022, www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/tencent-poised-to-lead-china-s-charge-into-the-metaverse-69311462.

[27] Boghani, Priyanka. “Tencent Poised to Lead China's Charge into the Metaverse.” *S&P Global*, 17 Mar. 2022, www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/tencent-poised-to-lead-china-s-charge-into-the-metaverse-69311462.

[28] “Metaverse Adds New Dimensions to Games.” *Metaverse Adds New Dimensions to Games - Tencent* 腾讯, www.tencent.com/en-us/articles/2201300.html.

things have been going on like that for 30 years in gaming. You have World of Warcraft, you have Fortnite, and Call of Duty that have strong communities. This goes all the way back to the dawn of online games."

We spoke about powering the online metaverse. He said "I think there has been a false start in the aggressiveness towards powering the metaverse. If you look at the history we haven't really moved past where World of Warcraft was twenty years ago. I know people who have found their spouses in World of Warcraft. That's closer to any type of Metaverse than anyone's dreaming up or spinning up now in Web 3 like Axie Infinity and Decentraland and places you can buy land."

He elaborated on his views on virtual real estate: "People are buying plots of land for 80K and I can't reconcile that. The most valuable game accounts ever in the history of video games are in Eve Online and World of Warcraft and going back to Dark Age of Camelot. You have to go with time — you cannot just infuse the value of your account. The reason accounts are so valuable in Eve is you have to skill up in time. You look at the value of these accounts and your Econ 101 classes, which I think a lot of people have forgotten. In these closed economic systems, you need time and work/product which creates value. To hear some big thing, just because they've laid out this virtual plot of land, and you have a buyer that is willing to spend 80K on it, is not sustainable or proven through the value of the system. That's another big risk for the metaverse." He adds, "you can't just say this is valuable and expect there to be buyers. It's kind of all Ponzi schemes. It's a big red flag for what is the metaverse."

Separately, he mentions that "the home screens of consoles are closer to the metaverse than any type of web3 metaverse play. You have your games, avatar, and friends. These platforms control a lot more of what the future might be in a metaverse because they're training people to login (Xbox, PlayStation, social media)."

We chatted about the role of games. He says games are "a place to escape where you can step away from the grind and bills and mortgage and you can be with friends and feel human. That's another reason the metaverse is skewed and we're not being honest about where it is going. If you want the metaverse to be a place we spend our daily lives, it's not the reason most people have been trained to log into their device. That's why gamers are rejecting this so hard. They're there to forget about all that stuff and don't want the real world coming in."

He continued that "games are a sacred spot for me. I don't want that to be tainted by corporate stuff and by people who want you to sit in a chair for money. That's why gamers are rejecting this so far. This is why I'm skeptical of most metaverse and web3 plays because the people at the top of the orchestration of designing it are not gamers. If they were, they would realize this is not what they want." He notes "the kids right now are in full rebellion of this. I have three kids myself. I watch their behaviors and their friends and they are in full rejection of this. They reject social media and don't understand why people can't just be nice to each other. I think Roblox is an interesting component to watch when introducing kids to these virtual worlds. But they align it with play."

So how do we create a metaverse that people trust? Kevin says "the word decentralized is super scary to big corporations in big countries. That's another big elephant in the room. If this gets big enough, the U.S. and other countries are going to regulate. Nobody likes to be decentralized and have their currency devalued. No one likes to play nicely in the sandbox with other giants (Microsoft, PlayStation, Google, Apple, etc.)" He adds that "Tim Sweeney is a great reference point to the proponent of open environments. It has to be more open source. As long as money is a thing, it's going to be hard to get these platforms to unite."

He believes that "Microsoft Windows is the biggest gateway to what the metaverse is because everyone has a copy of Windows. Microsoft is the leader of what could be a more integrated human computer."

In talking about interoperability, he says "people talk about interoperability which is a total farce. The tech challenges of interoperability are way harder than people realize."

He mentions that "Fortnite strategy has been to acquire Rocket League and acquire Fall Guys so when you play something that's owned by Epic you have to actually go to two logins (the one from the platform you're logging into and Epic). That platform layer of user account ownership is another huge thing for what the metaverse might be. If you control user accounts, you have a lot of power to predict where that flow and engagement will be."

Animoca Brands
Yusuf Goolamabbas
Chief Technology Officer
Yusuf is not speaking on behalf of Animoca Brands. These are personal opinions only.

Animoca Brands makes games and focuses on the intersection of "games and blockchain technology."[29] Their vision is to "build the open metaverse, starting with digital property rights"[30] They were the first lead investor of Axie Infinity, according to Yat Siu (Chairman of the Board at Animoca Brands). Animoca Brands is a big proponent of the open metaverse and creating value for the user. They have invested a lot of time and money into the space, having started building in the "NFT space since late 2017."[31]

Robby Yung, CEO of Animoca Brands, talks frequently about people owning their own data, through NFTs, which he believes will allow people to own digital content. Robby believes people are reluctant to change, and when asked about people's hesitation to embrace blockchain and NFTs, he likens it to this hesitation to adopt change and not the specific nature of NFTs. Robby believes blockchain is a fundamental element for building the metaverse, calling it "an open and free environment."[32]

Yat Siu believes the foundation of Web 3 is that we "have true digital property rights."[33]According to Yat, the difference between Animoca Brands and Meta is that Animoca does not acquire companies, they invest in them. He believes that everything we own is a social identity; it illustrates part of who you are. He believes people buy things for the network effects that come with them—the story and the community. The community gives it value and network

[29] DLDconference. (2022, May 20). *Gaming: The blueprint for the metaverse (joost van dreunen, Robby Yung) | DLD 22*. YouTube. Retrieved November 3, 2022, from https://www.youtube.com/watch?v=APw0BAPUbIk
[30] YouTube. (2022, April 12). *Building the open metaverse - a virtual fireside chat with Yat Siu*. YouTube. Retrieved November 3, 2022, from https://www.youtube.com/watch?v=Z_ePS6RmiC8
[31] Alvacorner. (2022, August 26). *Are we ready to live in the metaverse? with Yat Siu, CEO at @Animoca Brands*. YouTube. Retrieved November 3, 2022, from https://www.youtube.com/watch?v=sWUbTXS2jr8
[32] DLDconference. (2022, May 20). *Gaming: The blueprint for the metaverse (joost van dreunen, Robby Yung) | DLD 22*. YouTube. Retrieved November 3, 2022, from https://www.youtube.com/watch?v=APw0BAPUbIk
[33] YouTube. (2022, March 21). *Yat Siu: Investment philosophy in the metaverse and nfts | club metaverse pod #13*. YouTube. Retrieved November 3, 2022, from https://www.youtube.com/watch?v=JJ2BNzmbsdc

effects bring even more value. People like to be a part of communities that give them status or that say something about who they are." He believes that "the metaverse represents a better future."[34]

In an interview with Bloomberg Live, Yat Siu said "the difference of why virtual land in the Sandbox has meaning is because you actually have real ownership."[35] He believes "data is the valuable commodity in this space…we think of everyone who spends time on Facebook as working for free."[36]

Yat Siu stated that "Web 3 and the open metaverse is the natural next evolution of the internet."[37] The company is acquiring Web 2 assets and game companies to further their growth. Animoca Brands is very concerned with centralized organizations that own people's data—these are organizations who they think people need to be worried about.

Yat believes data is the most powerful thing in the world, but the problem is who owns it. This is where blockchain and Web3 come in. He wants to give people's data back to them, instead of the walled garden companies that own it today. With respect to NFTs, he wants to find as much utility as possible—for example, bringing an NFT to multiple games and experiences.

I interviewed Yusuf Goolamabbas, CTO of Animoca Brands, who describes the metaverse as a "set of experiences where digital assets can interoperate." Interoperability is key to Animoca's mission. Yusuf believes that "Blockchain gaming unlocks people's value of their time. People have consumed content for decades and not gotten anything out of it. You pay money to the game developers, but what have you got as the player? Blockchain gaming allows, because of true digital ownership, the metaverse to be composed of blocks which are truly digitally owned by you."

They have over 380 investments in the blockchain and Web3 space, in areas that some may call "competing metaverses" like Decentraland and The Sandbox. They always ask, when making investments, if the companies believe in the open metaverse. These are assets people own, and there is a market that values that. For Animoca, they give value back to participants within the ecosystem. They are not the only ones getting value. The user gets it as well.

The first easy utility of NFTs is getting access to a community. They work closely with Yuga Labs. Every NFT you own, whether it's part of a 10,000 collection or 1 million NFT collection, gives you access to a community. There are different ways to use NFTs—as membership and as something which can track your state within the game (as you level up you can get achievement badges linked to your wallet which are non-transferable). There are some NFTs that are tradeable. Blockchain is willing to push the envelope by indicating they are willing to disrupt themselves. He believes the metaverse will be pioneered by gaming companies.

[34] YouTube. (2022, April 12). *Building the open metaverse - a virtual fireside chat with Yat Siu*. YouTube. Retrieved November 3, 2022, from https://www.youtube.com/watch?v=Z_ePS6RmiC8

[35] YouTube. (2022, July 19). *Animoca Exec. chairman Yat Siu on the future of the metaverse*. YouTube. Retrieved November 3, 2022, from https://www.youtube.com/watch?v=YXCNd363i2E

[36] YouTube. (2022, July 19). *Animoca Exec. chairman Yat Siu on the future of the metaverse*. YouTube. Retrieved November 3, 2022, from https://www.youtube.com/watch?v=YXCNd363i2E

[37] YouTube. (2022, April 12). *Building the open metaverse - a virtual fireside chat with Yat Siu*. YouTube. Retrieved November 3, 2022, from https://www.youtube.com/watch?v=Z_ePS6RmiC8

Animoca Brands
Rich Robinson
Entrepreneur in Residence
Rich is not speaking on behalf of Animoca Brands. These are personal opinions only.

Rich Robinson, Entrepreneur in Residence says that they "advocate and believe in the open metaverse." As far as projects go, "The Sandbox was created by Animoca and we are widely invested in many other metaverses and games." He says they "want to help build and grow the open metaverse by enabling and advocating broad digital rights ownership for all internet users.

He adds that, "gaming is the tip of the spear and core to our metaverse strategy. (There are) 3.4 billion gamers, more than $180B in revenues and gamers are digital natives comfortable with virtual items, online communities and engage passionately with their gaming experiences and are also large crypto holders globally. Fifty-four percent of all gamers are in Asia which is where we are headquartered."

With respect to interoperability, he says "we believe in and advocate for the Open Metaverse and with the distributed, permissionless nature of the blockchain we are optimistic that can be realized.

Gala Games
John W. Osvald
President of Games
John is not speaking on behalf of Gala Games. These are personal opinions only.

Gala Games believes "the blockchain should be invisible in (their) games." Their website says they "use simple game mechanics that all players can enjoy, whether or not they consider themselves to be blockchain pros…Players get to truly own what they win in our games…We build alongside a vocal community"[38]

John W. Osvald, President of Games, believes Gala Games' main competitive advantage is how early they got into the space, how early their vision was defined, and the portfolio they have coming to market. He says "we were founded in 2017 with the same vision to build great games where you can own your assets. This gave us boom periods where we were announcing titles, doing pre-sales, and bringing in serious revenue. We have no investors. Everything we've done has been revenue driven. We poured that right back into the portfolio. Our competitive advantage is how far along we are."

He thinks of the metaverse as "as a specific genre of game. People will want to play all genres of games. The vision for Gala Games has always been that it is a platform business where the best games get launched. Content is king." At Gala Games, they "come up with hypotheses for how NFTs fit into the game, the tokenomics behind the game, and how you take an ownership piece and use it as a business, etc."

He notes "the first step was recognizing that we have a couple metaverse plays and coming up with a strategy by making our own games interoperable. We're working to give all of Vox a home in all of our games. We're also looking at all the collections out there having a place

[38] Gala Games. (n.d.). Retrieved October 27, 2022, from https://app.gala.games/about

in our world. If you come into Vox first and you have a Bored Ape, how do you bring that in? What if you own music NFTs or film NFTs? Some of it will have to be ubiquitous at some point. We focus on interoperability of our own games and how to bring others in as well."

Concerning the ownership of assets, he says "in gaming, if you let people own their assets, it's better for the user. Our founder and I come from a free to play background. Zynga pioneered that model for the West and did it in a way where it was a new market -- 2% of the users drove half the revenue so you're talking about people spending tens of thousands of dollars in games. One user is always playing one game — if you're spending that. That is a metaverse for them. What they have as a persona in that world is important for them. They're making it their whole life."

He also says, "this bleeds into real life. We found their real life friends became the people they met in the game. Who they were as a person and what they could accomplish in the game would be part of their real world. It always ends the same way. They will end up upset with the developer because things get more expensive or things they spent so much money on are worthless for other reasons. That's a tough sell -- the idea you spend money on digital assets that you believe are yours — and then you realize they are not. Coming from that holistically, don't these people deserve to own those assets? You couldn't do it before but now with blockchain you can grant ownership to the items. Everything else we've done since then has been coming up with business models and strategy to make this happen."

Vicki Dobbs Beck
Lucasfilm & ILMxLAB
VP, Immersive Content
Vicki is not speaking on behalf of Lucasfilm or Disney. These are personal opinions only.

I spoke with Vicki Dobbs Beck, VP of Immersive Content at Lucasfilm & ILMxLAB. I asked her what the metaverse meant to her. She indicated that "rather than using the term 'metaverse,' we tend to talk about 'next-generation storytelling.' By that, we're really talking about connected cross-platform storytelling. We describe it in this way because our goal is to transcend the physical, digital, and virtual worlds. In contrast, a lot of people talking about the metaverse see it as exclusively digital. Because our ecosystem includes the physical world, such as theme parks, hotels, cruise ships, etc., the inclusion is important because the physical world is a significant opportunity for us. In general, we think about our franchises holistically and how they would play out from a storytelling perspective on different platforms – how to weave connective tissue between experiences so you really get that sense that "the whole is greater than the sum of its parts."

I asked about past projects in the space. She said that "*Vader Immortal* was our three-part VR story series. Prior to the release of *Vader Immortal*, we created a location-based experience called *Star Wars: Secrets of the Empire* in collaboration with a company called The Void. In essence, it was a 'prequel' to *Vader Immortal*. *Secrets of the Empire* took place on an outpost on the planet Mustafar, and your mission then had relevance to the home-based series *Vader Immortal*. *Secrets of the Empire* was a 'hyper reality' experience which means there was one-to-one mapping of the virtual and physical worlds. For example, when you saw a virtual wall, there was actually a physical wall and, as a result, your brain really bought into that reality.

In addition, because we controlled the environment, we were able to introduce 4D effects -- what you're smelling, hearing, and feeling. While each experience could stand on its own, for those who did both *Star Wars: Secrets of the Empire* and *Vader Immortal,* there was a richer and deeper story experience that crossed platforms and locations."

She adds "more recently we produced *Star Wars: Tales from the Galaxy's Edge.* Our goal was to leverage the amazing world building done by Walt Disney Imagineering for Galaxy's Edge in the theme parks and invite fans to go beyond the boundaries of Black Spire Outpost into the wilds of the planet Batuu. The storytelling was tightly knit between the physical world, the theme park, and the virtual world. The goal was not to replicate the theme park in any way, but to expand upon and complement what could be done in the physical world."

As far as the future of content goes, Vicki says, "I think that where there are screens, there are opportunities for stories. That could be VR lenses, large screens, or digital screens. Each device provides unique opportunities and the key is to lean into those strengths when you're deciding how to approach the opportunity. VR's strength is its ability to transport someone to another world. AR is an opportunity to allow people to see our world differently, providing a digital overlay on the physical world. That, too, has interesting storytelling possibilities and we think it's a huge opportunity for the future. We're trying to understand what is fun, interesting, and compelling in an AR world – particularly in location-based AR storytelling. We're focused on creating more connected cross-platform storytelling, where each experience is designed to the strengths of the individual platform but are all a part of a bigger narrative strategy. It's like a mosaic. Each tile is an experience that can stand on its own, but if you pull back and see all of the tiles together, it reveals a richer, more complex design. I believe that is the real opportunity for 'connected cross-platform storytelling' and content for the future."

She adds "as we design these mosaics, it is important to create different portals or access points into the story world. Some people will want to engage in a 'laid back experience,' while others will want to jump in feet first. Further, fans may want different kinds of experiences at different times depending on their state of mind. All of these things must be considered when undertaking the larger holistic design." She also says that "looking to the future, I do think we'll see more immersive experiences, but I believe there will always be a place for 'curated linear content.' That said, it's entirely possible that linear content may become more immersive by virtue of how it's being consumed."

She further noted that "we love developing content for VR because we think it's such a powerful way to experience a story. Adoption, particularly of tether-less headsets like the Meta Quest, continues to grow. In addition, VR is not only being used for games and storytelling, but it is expanding into fitness, wellness, education and healthcare." In addition, she says "eventually, I believe there will be a single device that offers opportunity for all shades of reality. Think of it like having a dial. At zero you're fully in the real world and at 100 you're in the virtual world, and then there's opportunity for everything in between."

We spoke about content creators and consumers. Vicki says, "when people talk about the metaverse, or even next-generation storytelling, I think we're going to see all kinds of stories and storytellers – from curated tales by masters to user-generated and even community-generated stories and story worlds. They all have a place in the future. The key is to figure out how to do that in such a way that is both compelling and still respects the unique strengths and integrity of franchises."

Paramount
Doug Rosen
SVP of Games and Emerging Media
Doug is not speaking on behalf of Paramount. These are personal opinions only.

Paramount Pictures has entered the space with both experiences and NFTs. I spoke with Doug Rosen, their SVP of Games and Emerging media. Doug believes their competitive advantage is "our IP," and that "we have a good mix of IP that speaks to many different audiences, from Nickelodeon on the kids side, to our adult properties like Yellowstone and MTV and films from Paramount Pictures. We can take a really broad look at the market and think about the right way to enter for each audience." He notes that "kids" is more straightforward because there are platforms of scale like Roblox where the audience already exists. For adults, you can do it from an IP specific angle or more broadly from a platform perspective." "We're trying to do all of it and what I like is there is a spirit of exploration and innovation." Ultimately, they are focused on the stories they are telling in these worlds and the community they can build around that.

There is a core superfan base that loves 90's Nickelodeon properties that grew up with them. They are the core audience for where crypto and Web 3 markets are now. Paramount focused on those audiences. This fan base loves the IP and so they're happy to collect NFTs and excited for what comes with them (for example, a community). They did a drop with Recur and have more coming. Ultimately, they want to give consumers something they want regardless of the blockchain application.

On the NFT blockchain side Doug says "we have a partnership with Recur and we've done two drops; one around Star Trek and one around Nick. What do we do with it next? We have a community. The next drop plays up on that—rewarding the people who are already in, building more utility for the future, and continuing to build with things like TMNT." Doug notes that "we launched Nickverse for Roblox. We did a pop up around the VMAS, starting to think about the platforms not just as a marketing hook but as a place to build long term games and multi-year businesses." Doug notes they have "worked with Epic and others. There are places where it might make sense to license characters into a world." They want to know their fans well and build for them.

Roblox as a platform is aging up. Now they're thinking about older audiences and teens, what they do around other franchises, how they approach music on the platform, and having a broad approach.

CAA
Joanna Popper
Chief Metaverse Officer
Joanna is not speaking on behalf of CAA. These are personal opinions only.

CAA is the "world's leading entertainment and sports agency … recognized for its unmatched client roster."[39] I spoke with Joanna Popper, CAA's Chief Metaverse Officer on her views on the Metaverse. Joanna sees the Metaverse as the "next iteration of the Internet" citing a "tremendous amount of opportunity." The movement around Web3 is focused on "how we create systems that put more of the positive economic outcomes back into the hands of the creators and artists."

CAA recognizes this shift and the huge opportunity of talent, brands, and production houses. They see a tremendous amount of opportunity in the way content will be created and distributed. They also see opportunity with the way fans and communities engage with artists and build together. Within that context, the team decided that this is a "must act" area, so they brought Joanna in to lead the strategies around the Metaverse. CAA president Jim Burtson recently said that "CAA has always been at the forefront of charting new and emerging business opportunities for our clients. At this pivotal time in our industry, the metaverse will be impactful to shifts in content creation, distribution, and community engagement that drive significant opportunity for our clients."[40]

Today they are focused on both the client side and the business-building side. They are working with core traditional talent to make their way into the Metaverse. They are actively signing talent that is native or endemic to the space. For example, they are signing talent who have come up working with VR, NFTs, or AI. They are helping them build out their business-whether that is with other metaverse partners or with more of the traditional entertainment areas like TV, podcasts, books, and commercial endorsements.

On the business building side, CAA has an investing vehicle called Connect Ventures, which is an investment partnership with NEA. They are also thinking about the agency of the future and brand new businesses, where there will be fast growth. They're looking at partnering with and investing in new businesses.

Joanna sees four main buckets for how entertainment will evolve in the space:

1. **IP.**

   "If you start with the source of IP, there are new IPs that are born from VR and NFTs." With NFTs, they work with Jenkins the Valet (who they connected with the screenwriter client at CAA, who helped build out the characters and story). According to Forbes, CAA signed Jenkins the Valet (NFT avatar on the Ethereum blockchain) for "representation across books, film, TV, podcasts, and more"[41] They took creativity that came from the NFT project and then someone added a lot to it and created commercial opportunities from it.

2. **Marketing or Community Connection**.
   - "Various technologies can be used to connect with audiences in different ways. On one side, people use NFTs to connect and engage with audiences," bringing fans to feel more connected with that storyline and outcomes. What's interesting on the VR side is that you are in the story. Joanna calls it "the difference between

[39] *NEA*, www.nea.com/news/press-releases/creative-artists-agency-and-nea-accounce-connect-ventures.

[40] Chan, J. Clara. "CAA Hires a Chief Metaverse Officer." *The Hollywood Reporter*, The Hollywood Reporter, 5 Aug. 2022, www.hollywoodreporter.com/business/digital/caa-chief-metaverse-officer-joanna-popper-1235192903/.

[41] Hackl, Cathy. "CAA Signs Jenkins the Valet: Is This a Sign That Hollywood Is Embracing Nfts?" *Forbes*, Forbes Magazine, 27 Sept. 2021,

story-living and storytelling. On the NFT side, you are able to jointly decide where the story ends up."

3. **Fundraising**.
    - NFTs have been used for fundraising around film projects.
4. **AI.**
    - "AI is another bucket where there are so many different use cases, where we will see many more use cases as technology advances."

Going forward, Joanna sees Blockchain being used for different use cases around payments, privacy, piracy, and data. She separately adds that music is another whole area with a lot of interesting use cases around concerts and events, and NFTs being used as tickets, as well as avatars, skins, accessories, dance movements as merchandise. It is clear CAA has their hand in the future of storytelling, entertainment, and technology—and wants to pioneer the intersection of talent and metaverse.

Warner Bros. Discovery
Josh Hackbarth
SVP/Head of NFT Commercial Development and Animation Franchise

Josh is not speaking on behalf of Warner Bros. Discovery. These are personal opinions only

When NFTs started taking off a year and a half ago, around the Beeple sale back in March of 2021, Warner Bros. had assembled a group across the studio to determine how to enter the space. Josh Hackbarth, SVP/Head of NFT Commercial Development and Animation Franchise at Warner Bros. Discovery says, "we saw our fans were starting to engage in that space and we wanted to get in front of the pack. I got involved because we were launching a new *Space Jam* movie and we decided to tackle NFTs as more of a promotional element. That was our first project out of the gate, back in July of 2021—height of NFTs at the time."

According to Josh, "everything we do physically, we will look for a way to do virtually. How do we make it as easy as possible for you to bring your favorite stories with you wherever you're going."

On NFTs, they took a different approach not to monetize it, but really worked to get NFTs in the hands of their fans. Josh says "one of our tenets we were sticking by is to make sure we were being environmentally conscious. We were able to give away a couple hundred thousand NFTs for free and what we started to see was a community building around that collectible that we distributed."

What triggered the formation of an NFT department was their launch for a project for *The Matrix* In December 2021, where they took 100,000 NFTs, made them all completely unique (and created in Unreal Engine), and released them at $50 each. They sold out in six hours. As a result, "we saw all this demand for the space and that's when we saw there was something here. We built a team around it."

They did another drop for DC in April 2022 and Looney Tunes in June 2022. Josh says, "our approach now is to leverage the technology to enable things we weren't able to do with Web1 or Web2, meaning building relationships with our fans in a way they find valuable."

They have a VIP fan club approach that gives you exclusive access you can't get with other things. They're doing this with their DC program right now: "We launched a program back in March called the Bat Cowls, which are essentially unique Batman masks." If you have one of them, you could vote on the development of a DC Comic they are publishing. They had two votes a week for 15 weeks. They have been doing IRL events where you can only come if you're a Bat Cowl holder. What all of this does "is give us insight into what could potentially be scalable.

The card collecting behavior is also still alive and Warner is operating in that space as well. He adds, "the real value to our fanbase is leveraging the technology in a way that makes our physical experiences better. What NFTs bring you is a long-term relationship with that customer. We take a licensed approach to the table. We bring IP and stories, and we bring in partners that have a long-term vision for a platform."

Their competitive advantage is "storytelling and fandom. We intentionally parked this work within our consumer products organization. We are the #2 entertainment licensor in the world. We have Batman and Harry Potter and Bugs Bunny and all these characters fans want to bring into their lives. We are going to think of innovative ways to tell new stories."

HBO Max
Victor Pineiro
Director of Digital Innovation
Victor is not speaking on behalf of HBO—these are personal opinions only.

Victor is Director of Digital Innovation at HBO Max. Victor jumped into the metaverse in two different periods of his life. He spent 3 years studying the metaverse when Second life and World of Warcraft were prevalent between 2006-2009. He wrote and produced the documentary called *Second Skin* between '06 and '09. Recently, in the last two years, he was brought back into the world through innovation at HBO.

He defines the metaverse as "a persistent 3D virtual world or sets of virtual worlds that can be experienced synchronously." He doesn't think there will be just one metaverse and says "it seems like there will be a number of different persistent virtual worlds that exist simultaneously."

Victor says the second wave of the metaverse (or metaverses) grew from the popularity of Web3, crypto and NFTs, as well as Zuckerberg's rebrand of Meta. He says "what you had before was World of Warcraft and Second Life and what you have now is Roblox and Fortnite, and they have enormous appeal, and even more robust communities where people hang out. They're not just playing the game; they're spending time socializing in-world."

Victor says that "as early as the 90s, people have predicted that we're on the cusp of spending most of our time living in the metaverse. I saw it again in the early 2000s and it popped back into the zeitgeist 3-4 years ago. I don't see the metaverse people imagine in their heads for at least 5-10 years. It's not enough for the technology to be available. It has to be convenient. It is not yet convenient enough."

Concerning the future of content, he thinks "ultimately once people start flocking to the metaverse en masse, it will change the way we take in and engage with content. I don't think we're going to stop watching TV or playing video games. I think there will be new content types that flourish in the metaverse."

He says that the first big wave is "when an Apple or Microsoft comes out with hardware that feels as intuitive as an iPhone that's socially acceptable to wear." He notes the biggest unknown in the metaverse is how much you are going to interface with AR versus VR. He says "AR could take off to a point where we don't see VR become popular for a long time, similar to what Magic Leap is offering. Or maybe VR becomes easy enough to integrate into our lives. I don't see mass adoption while we are interfacing with computers and mobile devices. I don't think we will see mass adoption until the interface is better suited to engaging in a virtual (or semi-virtual) world."

On the role of gaming, he stated that "I have found both in my early venture in 2006 and more recently that gaming companies almost always pave the way for metaverse progress. Games are a language that humanity has spoken since the dawn of time, and Gamers are early adopters who tend to lean into these things. I think gaming will continue to be the way the metaverse gains traction and gains momentum. As it stands, the most popular "metaverses" today are all video games."

HBO Max
Samantha Garrison
Senior Manager, Digital Innovation at HBO
Samantha is not speaking on behalf of HBO—these are personal opinions only.

Samantha Garrison, Senior Manager, Digital Innovation at HBO thinks of the metaverse as "a virtual space or virtual world where people can come together to do various things-whether that be events, games, interactions, and more." She says "I think in time you will be able to watch shows and see live concerts (as you do now) in the metaverse. I think Covid accelerated it to some degree because people couldn't come together in person. I think it slowed down since the world has gotten back to normal, but I think in the next few years it will pick up again and people will start to use it in everyday life."

Samantha's team works on "creating marketing experiences using emerging technology. We look at different technology trends and use them as a platform to extend the storylines of our shows, create extra content experiences for fandom, and drive and tune in to whatever IP we're promoting. The metaverse has come up in a lot of conversations because it's the new up and coming tech so we do our due diligence to educate ourselves and what makes sense for our brand and our IP."

She describes a past project the team did a few years ago for Lovecraft Country: Sanctum. They did a three-part series. "We used themes, props, and storylines from the narrative and put it into this three-part series. The first event was a physical art installation. We commissioned Black Afro futurist artists to create these unique pieces for the events specifically. There was a meeting place where everyone would come together. There were 12 people in each group with a guide walking through the experience. They went through the art exhibit and had time to socialize. The second experience was a poem written by Shannon Houston who was a writer on the show and it was performed by Jurnee Smollet who was the lead on the show. It was a mashup with James Baldwin. The third concert was by Janel Monet who did four songs in

VR." Overall, the project "was very impactful during the time because it was part of the Black Lives Matter movement and Black storytelling was a major part in the Love Craft Country narrative. It was a safe space for people to come together. We had amazing content come out of it between the poem and the concert." Because of HBO's capabilities they "have very ripe content to work with which makes us stand out."

On Metaverse safety, she says "I think they need to have age restrictions and moderators and chaperones in those worlds. I don't think a lot of parents understand what it is or the safety of it all. For Love Craft Country, we had locked rooms. You had to have a specific invite in order to get into the events and there was a moderator and guide in all events."

Looking to the future, she says, "Right now is the adoption period. Over the next few years, it's going to be a lot of brands educating themselves and seeing where they fit in the metaverse and then it's going to take off."

Kinetic Energy Entertainment
Diana Williams
CEO and Co-Founder
Diana is not speaking on behalf of Kinetic Energy Entertainment. These are personal opinions only.

I spoke with CEO and Co-Founder of Kinetic Energy Entertainment, Diana Williams. I asked her what the metaverse meant to her. She talks a great deal about "franchise which is very much a business word in the business world. In entertainment, franchise can be described as the licensing of a story world to external (usually) partner/ vendors who will then re-develop or co-develop additional pieces of that story world for their specific lines of business and the audience. I really think about franchise as a business model and methodology that can allow for the audience, fans, and community to discover story on their terms, how they want to, and why they want to—without forcing them into a path that they don't want to go to. So, it is a way that story can always be discoverable and can always grow with the available technology as it comes along. But everything I'm saying is just basically a way to reduce the friction for internal story development and growth and for an audience to always be able to discover it." She adds that "when I look at that definition, I think a definition of the metaverse could be differentiated experiences that can be woven together or can be connected via a type of doorway but either way it is just less friction points for something to flow. An example could be I'm watching a T.V. series—I can then click something that brings me into a store, allows me to purchase some item I saw in the series, it gets shipped to me—there was no friction in this transaction. Then there is a way for me to easily go back to the series. That is gamified. In games, I die here and spawn back to it." In fact, "why can't I just 'spawn back' into the TV series I am watching?"

She adds, "looking at entertainment, how can I come into this story world and be in this story world and then when I decide there are items I want to have and keep that becomes my ownership? Can I get the comic book, watch the show, listen to the podcast, play the game, all of those seamlessly? But, as we know, there's complications with that and things that are going to keep it from happening. We're not close yet at all. But you still have to think in 'the blue sky,' in 'the what ifs.'"

We spoke about how she started Kinetic Energy Entertainment. She says, "in starting Kinetic Energy Entertainment with my co-founder Dario, we took to heart the idea of how you can build out franchise to be able to always communicate with your audience and community and continue to grow your creative with the creator at the center."

On new technology, she had numerous insights. She says, "technology is a solution in search of a problem. When that tech aka 'solution' then meets the 'problem' and they fit together hand in glove, and that becomes what some call 'the killer app'. Technology always needs that killer app which then allows the user/audience/etc. to understand how to use the tech. And that then leads to mass adoption." She continues that, "there are still structures in place that are going to keep us from jumping right into the metaverse. There's legal, there's IP law, there's who has what control over what. And then the metaverse (whatever it becomes) is still going to have to grapple with the contracts of pre-2000 and those contracts cut off a lot of avenues all in the name of protecting the IP. Not to mention, let's talk about COPPA. How are we gating? How are we looking out for children? All of these issues and many more will have to be discussed."

We spoke about Web2 versus traditional legacy media. She says, "everybody keeps saying Web 2 when they're talking about movies and film and T.V. That's not correct. Web 2 is represented by Facebook, LinkedIn, Twitter, Reddit, etc. Movies, T.V., podcasts, etc., are traditional legacy media. They will utilize Web 2 primarily for marketing but they are not Web 2. Traditional legacy media is built on contracts. There's a contract for everything."

I asked her about the future of content. She says, "some people like to say content is king. If that is true then the audience is the throne. Content is always trying to get the audience." She adds that "at this moment in time, the people that run studios and streamers (that came up at a certain time) were all trained in the same way. Television must be X minutes plus ad breaks, or X minutes without ad breaks. They're still thinking in these chunks as opposed to what serves the story best. That is the shift that needs to happen, and it's going to take a long time for it to happen. There were episodes of *The Bear* that were 23 minutes and 43 minutes – because that length served the story best. Sticking to times that feel like they still adhere to the dawn of the soap opera, is traditional or established thinking. We need all these people to either reset their minds or age out of the studios and get other people in. Games don't think about 'well it can only be this amount of time.' They understand bang for their buck and they really try to understand how the fan thinks."

On VR, she says, "I'm bullish on VR for what it can do for story. There's nothing like it (to be immersed and lost in a story). I'm bullish from a creative side. But I am a question mark on its future from a business side because it needs more people to have the headsets to justify the budgets that it takes to make content for it. If you buy a headset and you jump in there and there is not enough content that is an unsatisfying purchase. But it's hard to make content for a device or platform that only has 5-10 million people using it. We are continually stuck in a chicken and the egg scenario. Those that are financing VR content right now are pausing their budgets or walking away. That means the content is not being financed and therefore is not being produced. We're stuck in the same spot of the audience saying, 'I would've bought a headset but there's not enough for me to do.'"

On gaming, she'd indicated that, "what is great about gaming is they understand how gamers move. There are things that gamers accept that someone who is used to linear narrative and passive entertainment will not accept. Gamers are fine with interfaces and building their own character. They're fine with traversing along and looking around. Whereas others are used to having a story told to them – a lean back experience. Now, as entertainment and storytelling evolves into its next phase, you're asking these lean back experiencers to do work and they're not equipped for it. They don't know the different cues to look for. The learning curve is steep." She adds, "I think people are going to have to start addressing what success is in this new world. Is it okay just to have a TV show do really well by whatever the current definition of well is? Or do you have some crazy KPI in which 50% of those people viewing, you want them to now play the game? There's that friction point."

How far away are we from there being less friction? Diana says, "I think it's really far. The contracts are tight. Think of a mall. You walk into the main door of the Westfield Mall. Westfield owns the property and the building. There are all these different stores but there's also different experiences. I can go to the movies (some have arcades) and I can eat, shop, etc. The shops and vendors there are paying a type of rent to Westfield. That's kind of like a metaverse perhaps. Once I'm inside, I have all these different things I can do. They all take the same dollar so I'm not having to do any exchanges. It's frictionless and easy for me. But all those things that are existing in there from Claire's to Auntie Anne's to AMC Movies to Nordstroms are paying to be there. But they're all different corporations and they're all different copyrights. It's IRL so I can have kids in there and adults and everything is fine—nothing gets broken. But if that becomes digital and there is a monetary mechanism in there, how is Disney going to feel about having *God of War* right next to them? That's not going to fly. You can't do it because of COPPA law but they're also not going to want it. I think that's what breaks the idea of the metaverse right now."

She adds**,** "that's the legal side. Let's talk about technology. *Zelda* (the pipeline and rigging on Zelda) is wholly different from *Mass Effect*. So am I building two pipelines and infrastructures to have them both in the same metaverse? Does that even make sense? Do they even match together? Probably not. *Mass Effect* may be built on a proprietary (perhaps patented or trademarked) rigging system that is owned by BioWare/EA. They're not going to want other companies seeing that because the code could be stolen.. These are some of the things that will have to be addressed."

We touched on *Ready Player One.* She says, "Another issue I see is people referring to *Ready Player One* as the be all end all of what they want for the metaverse. Does no one remember that the Oasis was owned by one white dude and people lived in poverty and we couldn't do anything? And we want that? That's a problem. Also, it was not easy to get that contract done for *Ready Player One* as a movie. They had to get so much IP cleared to have all those brands in there. It was all intellectual property owned by several different companies." She adds, "the fundamental question I have is-how am I getting into the metaverse? We talk about what we are going to do in the metaverse. But am I going into it via an app on my phone, am I downloading the metaverse from Steam on my PC, is it a headset (because *Ready Player One* was in a VR type of headset)? These are the things that not a lot of people are talking about. They're just saying 'metaverse.'"

Intel
Rama Harihara

Principal Engineer (AI) Intel Corporation
Rama is not speaking on behalf of Intel—these are personal opinions only. This is not Intel's point of view.

I spoke with Rama Harihara, Principal Engineer (AI) at Intel Corporation. Part of her research work is figuring out how to use machine learning for rendering instead of traditional graphics engines. She says, "everything is going to be 3D. You can think of it like there is no more 2D internet. 3D rendering becomes very critical in the metaverse world. In regard to being able to create immersive rendering, how do you make sure you can render photorealistic cool looking visuals in a specific amount of time? You don't want people to get dizzy if they don't have a frame ready in the right amount of time. Also, It should be easy for people to add content to the metaverse."

Intel is building experiences and technologies that other metaverses can leverage and build on. Rama says there are three distinct layers of metaverse

- Compute layer where Intel excels as a semiconductor manufacturer.
    - "We are the ones who will probably build the next zeta scale compute system."
    - She notes that the compute capabilities must grow. We are touching exaflops today and we need to grow compute by 1000x to get to zetta scale.
    - They will have to do good software aggregation, server-side infrastructure setup, on demand scaling, distributed rendering and orchestration will become important.
- On top of that is the connectivity layer (whatever is next 5G 6G, Wi-Fi protocols).
- Third is Intelligence: virtual worlds, monetization, 3D avatars, content creation

She says "for immersive visuals, we need to make sure reflections and refractions look good. Ray tracing and path tracing are CG techniques that provides the capabilities to get such immersive visuals, but there is a heavy amount of compute work that needs to happen "

With the launch of Intel's discrete graphics cards called Alchemist, they added ray tracing cores to be able to do these advanced rendering effects at interactive speeds. They also added systolic array to speed up matrix multiplication into the GPU to accelerate machine learning workloads. With those two things in place, perceptual rendering – using both traditional algorithms and neural algorithms -- they can do immersive visuals.

There are machine learning techniques called NERF and stable diffusion which are tools that enable you to create photorealistic content. Stable diffusion lets you generate images via text. They want all of the tech to run on their GPUs to enable creators. These are some of the ways they are creating better content to create better visuals. They want to make it more inclusive for people to enter the metaverse.

Intel's competitive advantage flows from the fact that "we own the Intel platform (the CPUs and GPUs). We play both in the cloud and client platforms. These are major strengths that will enable anyone to run their metaverse on Intel. They support a bunch of APIs as well. They have security protocols called SGX. If someone is trying to mint an NFT or create a digital identity, you want it to be secure. No one else should steal it. They have security protocols embedded in processors that address hacking and stealing of information. They want to make sure the experience is both immersive and secure.

With respect to the future of AI, she says “AI is going to be everywhere. AI will influence gaming; we came up with a super sampling technique called XeSS to improve fps using AI.” NeRFs can be used for content creation. Intel “Bleep” is an AI technique to block out slurs. NPCs can be trained to catch bugs in the game. AI is used for photo and video editing, noise removal, de-blur etc. AI can be used to generate simulations for self-driving which is important. AI is used in healthcare for cancer diagnosis and treatment and genomic analysis. Imagine doing surgery on a digital twin and perfecting the surgery on a human.

Polygon Studios
Brian Trunzo
Metaverse Lead
Brian is not speaking on behalf of Polygon Studios. These are personal opinions only

Polygon Studios is the strategy arm of Polygon the blockchain. Brian Trunzo is a Metaverse lead at Polygon Studios on the BD team (Director), working on the entertainment team and collaborating with his gaming counterparts. He works with media properties, fashion brands, music, television, film, IP holders to get them into “the metaverse”. He also works with the world builders, those who are building Apps on their platform to integrate smoothly with their platform.

He says “we are the business unit of Polygon the blockchain and we work as an onboarding engine to bring the best developers and IP holders into the Polygon ecosystem. Then, we work with them in a partner success tech integration marketing capacity.”
He defines the metaverse as the “endless convergence of our physical and digital realities through property rights and identity.”

Polygon Studios’ competitive advantage is “first, it’s the tech: Polygon the blockchain. We have a strong lead in the open decentralized metaverse. Anyone who has a level of cache or vision in the space that is promising is building on Polygon.” He also says it is the personnel. “They understand the tech and the culture side (understanding the consumer and gamer using the applications).” He says “we have domain expertise across CPG, fashion, music, etc.”

They’ve worked on Adidas’ NFT project, Gucci’s development inside The Sandbox, Metaverse fashion week at Decentraland, and Starbuck’s partnership for their loyalty program. Brian says that “in the case of a fashion brand or any brand that is working with one of our decentralized applications like a Decentraland or Sandbox, either the opportunity comes to us as a blockchain and we work with the dApp on a project or the IP goes directly to the dApp and we get pulled in to help with final details, particularly marketing—specifically to Web3 natives who are using the platform.” They “have a vested interest in increasing daily active users in these decentralized virtual worlds. We are the connective tissue to make sure things go seamlessly with some of the intangible aspects of developing within these worlds. We worked alongside Decentraland with Metaverse Fashion Week and UNXD to make it as seamless an activation as possible.” They provided thought leadership on it. In some instances, they provide capital for sponsorship. He notes that “smart brands project out and think about what retail looks like in say, 2029.”

We spoke about interoperability. He says, “you can’t have (in my mind) a significant convergence of digital and physical realities without property rights. Property rights can be loosely understood as NFTs and fungible currency and internet native money. If the users don't actually own what is being created within these worlds, I personally think you'll have a tough time creating meaningful experiences where people will want to spend a significant amount of time. You can create these environments where the user isn't just passively consuming but where they are producing relevant and significant experiences. The amount of UGC needed to create a decentralized metaverse is enormous and the only way to incentivize people to build that is by giving them a stake within that world."

Supersocial
Yonatan Raz Fridman
Founder and CEO
Founder and Host of Into the Metaverse podcast
Yon is not speaking on behalf of Supersocial. These are personal opinions only.

I spoke with Yonatan Raz Fridman, Founder and CEO of Supersocial, and Founder and Host of Into the Metaverse podcast, on his views on the metaverse. According to Yon, Supersocial is a "company that creates the most groundbreaking and cutting edge experiences for the metaverse." He says they do this by "being in all the most important platforms that are going to be part of the metaverse ecosystem."

We spoke about his Metaverse vision. He says, "in my imagination, the metaverse is going to blur the lines between what is real and what is unreal. I think we're going to have a symbiotic relationship between the virtual and the physical. Things will be connected to one another in a much more seamless way, where actions you take in the physical world are connected to your virtual avatar. People will care about their virtual identity as much as they do about their IRL identity. The way you experience the internet virtually will be in a 3D format. You will have virtual content overlayed on physical spaces because of additional tech like AR. There will be access points everywhere."

On interoperability, he comments "there is a war on who owns identity. Apple wants to own identity. Google wants to own identity. Who has the access point for identity? What is interoperability of identity? It's a complex question. There will be some level of interoperability on the technological infrastructural side of things. You can already use so many software tools that integrate with Omniverse from Nvidia. I can see a lot of interoperability happening on the infrastructure level."

How does he look at the Metaverse ecosystem? He focuses "at the platform technology infrastructure side, the consumer experiences applications side, and what people interact with (it could be consumers like with Omniverse)." He notes that it is important to look at "what is being delivered to users and how it is built. Some companies do both, but most do not. There is a distinction between companies like Nvidia that sell technology and companies like Google that build technology. Google doesn't sell technology to other people. They build technology that allows them to create consumer experiences."

On the role gaming companies will play, he says that "even within these companies, there's a lot of differences. PlayStation and Nintendo make hardware, devices, and content. Roblox just builds the platform. They don't make content. Some of them that are more platform driven like Roblox or Unity will gradually evolve to be so much more than games. The Metaverse is not about games. In the next several years, games will continue to be a key use case, but everything initially will feel like a game. With brands, it will feel like a game. Long term, I envision the Metaverse being orders of magnitude above just games. I imagine that companies like PlayStation, Nintendo, and Xbox will continue to play an important role."

Ball Metaverse Research Partners
Matthew Kanterman
Director of Research
Matthew is not speaking on behalf of Ball Metaverse Research Partners, these are personal opinions only.

I spoke with Matthew Kanterman, Director of Research at Ball Metaverse Research Partners, on his views on the Metaverse. Matthew has "always been of the opinion that we can't be deterministic about technology. If we become too deterministic about what the metaverse will look like, we will turn it into something that is familiar to us and we will end up with what we already have. Remember when we had PalmPilots and Blackberries? Could you have envisioned that Instagram or TikTok would exist today? No, but people were innovative and came up with new uses of technology to create these new platforms that are now multibillion dollar businesses."

On creating an ethical metaverse, Matthew says "Open standards are a key. Governments need to get in front of the metaverse. For most of the lifespan of the internet, we've regulated the internet after bad things happen. Few governments have been at the forefront of regulating before bad things happen. We are starting to see some governments change their policies today. How can we shape policy today to promote a healthy development of the metaverse tomorrow…instead of after the fact? What I'm watching most is which governments are going to set up the framework to enable the healthy development of the metaverse."

In speaking about the value of digital real estate, he says "the value of virtual real estate NFTs is what you build. What are you doing with your virtual land? Why would you build what we already have, when I can just go outside? Build something that is new and exciting that I want to come to. Rather than try and copy what we already have, build something fun and we'll see if it adds value."

His "vision of the metaverse is that it is not just about screen time and sitting and playing Roblox. How do we use technology out in the real world to enhance the experiences we have together? If we go to a baseball game together, can I get stats on the players streamed straight to a set of AR glasses or other device while I'm watching? That's enhancing the physical world with digital technology."

Concerning the future of content, he adds, "the future for these companies is more than just movie screens and T.V. screens, but how we put our IP in front of as many eyeballs as possible. That's the same for fashion brands. How can we interact with consumers in a more direct intimate way with that brand and IP." That's what he thinks is valuable.

On interoperability, Matthew says "what we've seen historically is that large companies like to create walled gardens. People forget that Apple is the third largest video game company in the world because of the 30% commission from mobile games on the app store. They don't actually make games, but they're the third largest video company by revenue. From that perspective, it's hard to align that altruistic, democratic, decentralized view of the world as far as identity and individuals controlling the internet, in this world where we have all these powerful platforms. It's too early to determine what is going to happen. I think there's a lot of people out there who are trying to build it in a way where we get to the more evenly distributed version of the internet. But I'm also rational and understand that if we are going to build these platforms that we think will have millions of users in shared space these companies are not going to build unless they're going to get economic return. I'm optimistic that we can get a better version of what we had in the Web2 era, but I don't think it's going to be this purely democratic altruistic view that people are talking about."

BUCK
Daniell Phillips
Executive Producer focused on Immersive Experiences
Daniell is not speaking on behalf of BUCK. These are personal opinions only.

I spoke with Daniell Phillips, Executive Producer at BUCK, on the nature of their work and his vision of future technology. He says, that "at BUCK we work with a lot of the big tech companies, as well as future-facing brands who truly value innovation and the possibilities for emerging technologies to evolve story-telling and engagement. We try to stay at the forefront and our visioning work with these partners helps us do that, for instance developing many of the earliest filters for AR on Facebook and Instagram, a good example of early building blocks for the metaverse." They've worked with everyone from established tech leaders like Google and Meta, to web 3.0 pioneers Bored Ape Yacht Club.

They see opportunities with world building tools, virtual performing, virtual concerts, more traditional content, and just how brands show up in these virtual worlds. They work in VR/AR/Virtual Production, amongst other offerings. They specialize in experience design and how to visualize experiences in these spaces. BUCK's ethos stems from a desire for visual quality and craftsmanship.

He spoke about a new initiative involving multiple companies: "Residence is a new initiative from BUCK. It's a network of creative companies, including Anyways Creative, Creative Lives in Progress, Giant Ant, If You Could Jobs, It's Nice That, and VTProDesign."[42] He says they have "been searching for other companies that value people, craft, and creativity the way we do. Now that we've found some of them, we decided to band together. There's strength in numbers. It's a community and creative network that will enable greater access to creative careers and foster the flourishing of creative talent."

We talked about his vision for the future. He notes that "it is a truism of working in this space" that we "overestimate the change that's going to happen in one year but we underestimate what is going to happen in 10 years." He adds that there "are massive technical leaps that have to happen for there to be this layer of augmentation or an ability to move seamlessly between all of these worlds. In saying that, change happens by stealth as well.

[42] Lang, J. (2022, October 7). *Buck, Giant Ant Launch Global Multidisciplinary Organization Residence*. Cartoon Brew. Retrieved October 31, 2022, from https://www.cartoonbrew.com/studios/residence-creative-network-buck-giant-ant-221984.html

People don't think the stuff they do on Snap, TikTok, Instagram, or even online shopping are the behaviors that have anything to do with the metaverse. Then, all of a sudden, they combine – and gaming suddenly becomes a branded experience and you can go shopping in Roblox. And that merges with younger generations that do not think twice about those behaviors because they are so natural to their experience. The ideas of different personas for different spaces, having friends you've never met, hanging out in a virtual space, the whole streaming generation receiving content in a different way are natural to the younger generation. What people don't realize is they adopt it before they realize what they're doing. You change and evolve your behavior."

Framestore
Christine Cattano
Former Head of Immersive at Framestore
Now with Accenture's Metaverse Continuum Business Group (Metaverse Studio Lighthouse Client Strategy Lead)
Christine is not speaking on behalf of either Framestore or Accenture. These are personal opinions only.

Widely known for their Oscar-winning visual effects, Framestore is a global creative studio working with the film, advertising, TV and immersive industries across all stages of production.

When Christine Cattano, former Head of Immersive U.S. joined in 2013 "Framestore had been experimenting with motion capture and CG characters, and starting to explore using real time engines as a way of bringing the company's core skill sets of 3D CGI design and execution into a more interactive space. We saw early synergies with VR, and in 2014 we worked with the company doing the *Game of Thrones* touring exhibition to create a VR prototype for HBO, who has a long history of innovative marketing campaigns. HBO loved it, and the rest was history: that was the first big commercial VR experience. And from there, everything exploded: we really saw this as a moment to focus more seriously on immersive technologies as the next frontier of transmedia storytelling."

She says, "our work in Immersive is largely driven by entertainment and tech clients, working with the latest hardware and software, as well as forward-looking brands looking to drive innovative consumer experiences. She notes that "Framestore is well known for creating photo realistic visual effects, and specifically iconic characters and creatures like Dobby from Harry Potter, Rocket Raccoon & Groot from the Marvel franchises. There's always been a big focus on our talent: and the level of quality and craftsmanship that goes into the work we do. While we have a focus on innovation at the company, it is always in application to a specific creative intent and/or improving our craft."

We spoke on ethics. She says, "I do think technology itself can be neutral, but its applications can vary widely on the moral spectrum. But, I do believe the people and companies who *design* this tech, especially with the intent to profit from it, should be accountable for the power they wield, and responsible for monitoring the ways it is affecting society positively or negatively, and to both be transparent and improve on that, even at the expense of profits."

With respect for the future of AR/VR, Christine says, “for me, one of the most exciting parts of the idea of the metaverse is the intersection of the digital world with our physical one. That feels a bit more immediate, and doesn’t sacrifice human interaction, or root us out of the physical world – likely at a time when it needs us most. I think there are really exciting use cases for both VR & AR outside of gaming & entertainment that give us a glimpse of something truly transformative, such as how these technologies can greatly advance key areas of healthcare and education.” She thinks that “AI is going to advance creator tools that will aid in enabling the creation of the Metaverse, as well as a lot of other things. I think that’s one of the more interesting threads that has become apparent recently. She adds, “Nvidia has a very specific view on AI and how it relates to the metaverse. They likely understood it before most.”

TRIPP
Nanea Reeves
CEO, Co-Founder
Nanea is not speaking on behalf of TRIPP-These are personal opinions only.

I spoke with Nanea Reeves, CEO and Co-founder of TRIPP. She has an extensive background in the gaming space. She has had “a long career in the video game industry” and believes that “it is important for young girls (children) to play video games. It leads to an organic interest in technology. Interest has to start early and there is a lot of evidence and data that says if you can get started before age 12, playing video games can strengthen spatial reasoning skills. My experience was that playing video games led me to a great love of technology.”

We spoke about virtual worlds. She notes that, “virtual worlds have been a part of the video game industry for a long time. I used to go on multi-user dimensions (MUDs). I see the metaverse as an evolution of that, that has evolved alongside the technology evolution as well. In 2000, you saw this massive shift in tech and computing, moving from desktop to hand and all the innovation that came out of that. At that time, you would hear ‘oh I would never do that’ and I have found that this statement is a precursor to a massive shift. That’s really exciting to me. Even when the iPhone came out people said they were never going to give up their Blackberry keyboard.”

On cloud gaming, she says, “I was an early investor in Oculus. I had worked with the founding team at a cloud-gaming company. Cloud gaming was a precursor to mobile edge computing, The combination of edge computing and lighter weight headsets (because the compute power will be in the cloud not the device-which makes it heavy) is what is going to make the metaverse explode. We are on the verge of that.” She adds**,** “There has been a steady build of infrastructure required for the metaverse starting with open world video games, digital goods being sold in games and app stores. And now we are in the early days of spatial computing - the migration of computing moving from the hand to the head. I see this as one of the most exciting times in our lifetime and we are still in the early days.”

With respect to Tripp, she says “our goal at TRIPP is to lead how wellness gets defined in the metaverse.” She adds, “there was something about going in and out of the early VR experiences that I was struck with this feeling of escape, or retreat, or respite—that was really interesting for me to investigate. Everything I’ve learned in my career was to prepare me to run a metaverse focused company.”

Nanea indicated that her company would seek to change and augment the metaverse as she believes "the metaverse is an opportunity to expand the human experience. However, a lot of what I see in the current metaverse narrative is just thinking of it as a 1:1 mapping of all the crappy things we've built in this world, like taking your digital twin to a virtual mall to buy virtual sneakers. If that's all we build, then we should throw in the towel. One of the benefits to video games is having different personas and identities. It doesn't just have to be about replicating 'digital me.'. We have to think outside the box."

She doesn't believe the metaverse should be built by corporations. She believes "it should be built by its citizens and that is the big shift. Companies like TRIPP can create immersive experiences, but eventually you will see us look like a toolkit to allow other people to create wellness experiences."

They have a very intentional approach to meditation: "when we approach meditation in VR, people thought we would put them on a 360 beach and have them inhale and exhale. No. When we did a prototype, it didn't feel good. The brain knows what the beach should smell and feel like on your skin. We wanted to create metaverse experiences that you cannot have in real life. We thought 'let's put you in a cosmic flotation tank' and 'can we show you your breath like cosmic stardust,' and 'can we make you feel like you're floating and ascending.' There's no gravity or physical limitation, so you can do that in the metaverse. That is the first thing we launched—using the inherent native container of immersion to drop whatever you're thinking about and to connect to an environment that makes you go 'oh wow,' Now we're experimenting with how to take communities through this after acquiring the largest mindfulness community in the metaverse in January of 2022."

She wants to transform the relationship to mental health and emotional well-being in two ways. She says "Give yourself agency in having control over how you feel, by using technology for good." She wants us "to start thinking about mental health as just health. Drop the mental. Let's get ahead of it like we do with physical health."

On VR adoption, she notes that "the way we look at the industry right now (VR/AR/mobile/desktop) it's all very vertical. I believe we will have something similar to the phone where we just have glasses. We will go to dinner parties and say, 'glasses off' and connect with each other. We just launched on the Meta Quest Pro with a MR experience that opens up the camera and rewards you with AR gifts if you do our app any three days within the same week. They grow and glow over time and you level up—it's true gamification. We're designing for a layered experience."

She says the future for her would be "your pupils indicate a stress signal. And this is detected by your data enabled glasses. We can prompt you directly in your glasses to take a break and just give you a little augmented reality overlay that takes you through guided breathing exercises. If you're highly agitated, it'll say, 'go find a quiet space where you can sit and be in full immersion—you need assistance right now to really drop in.'" She adds "there's a very dystopian version of the metaverse but there is also a positive one where you're empowering people to understand how they're feeling, and give them access to tools and guidance on how to best support themselves; and that's what we want to be a part of."

She also says that "once the devices are on the head, the ability to integrate biometric signals and empower bio feedback loops increases our potential significantly. You have stress signals that can be captured through eye tracking lenses, you have gaskets that can detect changes in skin and temperature, and cameras that can pick up vascular activity. We have a patent where we can detect heart rate and respiratory rate from the gyroscope itself without having to sync a wearable with it. Going back to the dystopian narrative, in the wrong hands, those signals could be used irresponsibly. Even with the best intentions people and companies will make mistakes. We should learn from the internet 2.0 and look hard at how to best protect user privacy and create healthy communities in the metaverse."

Mozilla
Liv Erickson
Senior Manager, Hubs Lead
Liv is not speaking on behalf of Mozilla. These are personal opinions only.

I spoke with Liv Erickson, Senior Manager, Hubs Lead at Mozilla. Liv "got interested in the space back when I was working at Microsoft in 2014. I tried on an Oculus Rift and it completely shifted my career trajectory. I started teaching myself VR development first with Unity and Unreal, and started writing open-source projects. I shifted into Web VR development as Mozilla was entering the space. Engineers from Google and Mozilla were collaborating on a standard for VR devices to work with the browser, so that you could write web pages that could take advantage of the VR headsets that were being built. That was a pivotal moment for me and how I started thinking about the metaverse and the immersive web."

She adds, "I joined Mozilla back in 2019 as the product lead for a product called Hubs, which is the team I am still working on. Hubs is essentially a do-it-yourself metaverse platform, making it possible for people to host their own applications and experiences that run in the browser rather than be tied to someone else's platform. What we're trying to do is give creators of these different experiences tools that make it quick to get into the space, because you don't have to download and install things. You can just go to a link and jump in, and you're in that space with other people. Also, we give them the control to own their content and own their experience and customize it and extend it. We frame it as the WordPress for the metaverse or WordPress for the immersive web." She also says that "we are getting ready to launch a new subscription service so that creating your own metaverse application will just be a couple of clicks."

With respect to competitive advantage, Liv says "I think that there is a lot of building on trust that can be a differentiator in this space. We've been in the web working on how people interact online for a really long time and people know that we are building products and services and being advocates for products that put people above profit. There is also a community element that comes from being open source and being able to share and grow what we're learning with the community, rather than keeping it very close to us. That can be a strong competitive advantage, especially for a technology that is inherently driven by network effects." She adds that "Mozilla is a really interesting corporation, fully owned by the Mozilla Foundation, which is a non-profit. Because of that we don't have very many shareholders that we're beholden to other than the foundation. So, we have an ability to incorporate mission driven work and advocacy/policy into what we're doing, and make that a key pillar of the products and services we're offering. That isn't something other companies always have the ability to do."

We spoke about use cases. She says, "people like connecting with other people. What we've seen, especially over the last two years, is that the tech we're currently widely using is good for some types of connections, but not all types of social experiences. It's really easy to use it for events and say events are the use cases for the metaverse. If you look at a lot of the different metaverse platforms, they're focusing on messaging like --host your event here." She believes it goes further than just building event software because what "a lot of these types of applications - including Hubs - are trying to do is allow people to tell stories meaningfully. It could be things like a non-profit creating a museum that showcases the work they've funded or the cause they're raising awareness for. I love the personal museum use case of being able to create museums for people to come in and explore, and that's just one example of how people can use this technology for connection, awareness, and education."

I asked her about the role of gaming companies in the metaverse. Liv says, "there's a couple of things games do extremely well for the metaverse – for example, getting people on board to the mechanism you use to navigate in 3D. If you've played any kind of first person game or third person game, you've probably used the WASD keys before, and you're familiar with the concept of navigating in a virtual space. I think games are doing a really good job of teaching these forms of interactions to the extent that in a couple of years, people won't necessarily need to be explicitly onboarded to interacting in 3D spaces because so many people will have grown up playing a video game. I think there's also a lot of places where they're doing a really good job of both exploring sandbox creation tools (like what Fortnite and Epic is doing) and getting people in the mindset of creating and customizing their worlds and themselves in these online arenas."

Additional Major Players—Additional sections where I couldn't get interviews

Apple

Apple is one of the most secretive companies on their metaverse strategy. They were unsurprisingly absent from the Metaverse Standards Forum, a Forum created to promote interoperability amongst different platforms. Medium calls Apple's competitive advantage its "brand equity" as Apple is known for "delivering the best quality products and services. It has maintained trust." [43]

They are straying away from using the word "metaverse." Tim Cook, Apple's CEO, recently said "I always think it's important that people understand what something is," and "I'm really not sure the average person can tell you what the metaverse is." [44] He says VR is "something you can really immerse yourself in. And that can be used in a good way. But I don't think you want to live your whole life that way…VR is for set periods, but not a way to

[43] Garg, Parth. "How Has Apple Gained Competitive Edge over the Years?" *Medium*, Mac O'Clock, 18 May 2020, medium.com/macoclock/how-has-apple-gained-competitive-edge-over-the-years-aff0a259de0d.
[44] Porter, Jon. "Tim Cook Is Latest CEO to Question the 'Metaverse'." *The Verge*, The Verge, 3 Oct. 2022, www.theverge.com/2022/10/3/23384708/tim-cook-metaverse-skeptical-meta-ar-vr-headset.

communicate well." [45] In regard to AR, Cook says "I think that one day we will wonder how we ever lived without it." [46]

Mark Zuckerberg recently said that
Meta and Apple are in a "very deep, philosophical competition" when it comes to the metaverse." [47] Zuckerberg sees Apple as one of his biggest competitors because Meta wants an open metaverse and Apple may want a proprietary one.

One can see how Apple would make a closed metaverse system like they have with IOS and they are potentially the metaverse's biggest challenge to interoperability.

Magic Leap

Magic Leap bills their new AR headset as "the most immersive enterprise AR device … Built for work. Designed for comfort. Created without constraints."[48] They stand in stark contrast to other headsets on the market, like the Meta Quest 2 (VR), that are geared more towards the average consumer who would use it at home and not enterprise customers. However, they have a new competitor with Meta's Meta Quest Pro, a headset priced at $1500 and targeted at business customers. For contrast, Magic Leap's product is $3299 for the Magic Leap 2, $4099 for the Developer Pro, and $4999 for the Enterprise edition. [49]

Magic Leap goes after a higher end user experience and premium segment with more fidelity. It has a larger AR field of view (which makes for a more powerful experience), a lighter weight, strong capabilities with room mapping, immersive audio, brightness across a broader variety of situations, and something that tracks where you are looking, so that it can deliver more compelling experiences. The effectiveness of these attributes helps with image clarity and image placement.

They also have a range of operations (which means how close or how far they can make digital content appear to you). This is important because there are use cases where you need content to be close to you (operating rooms) or far from you (warehouse or surveying equipment). They also include dimming that lets you see content in a brightly lit environment, which is tough to do in AR. Because of dimming, you can see across a broader range of experiences (warehouse environments and medical environments). Magic Leap wants to create solutions that are practical and can be used for prolonged periods. The technology, and IP they have around that technology, is their competitive advantage.

Prior to the release of the newest device, in 2020, Magic Leap laid off roughly half of their employees, moving their ambitions from consumer to enterprise. [50]

On a podcast with *Masters of Scale*, Peggy Johnson, CEO of Magic Leap, in describing what Magic Leap does, says they "make a headset, and when you put it on, you still see the

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[45] Porter, Jon. "Tim Cook Is Latest CEO to Question the 'Metaverse'." *The Verge*, The Verge, 3 Oct. 2022, www.theverge.com/2022/10/3/23384708/tim-cook-metaverse-skeptical-meta-ar-vr-headset.
[46] nowthismedia. "Apple CEO Tim Cook Interview – 'The Future Is Now' [Full Interview] | NowThis." *YouTube*, YouTube, 1 Oct. 2018, www.youtube.com/watch?v=vX9xBB_vBsc&t=478s.
[47] Hamilton, Isobel Asher. "Mark Zuckerberg Told Staff Meta Is in 'Deep, Philosophical Competition' with Apple to Build the Metaverse, Report Says." *Business Insider*, Business Insider, www.businessinsider.com/mark-zuckerberg-meta-sees-apple-as-metaverse-rival-report-2022-7.
[48] *Home*, www.magicleap.com/en-us/.
[49] "Where to Buy." *Where To Buy*, www.magicleap.com/where-to-buy.
[50] Heater, Brian, and Lucas Matney. "Magic Leap Reportedly Slashes 1,000 Jobs and Steps Away from Consumer Plans." *TechCrunch*, 22 Apr. 2020, techcrunch.com/2020/04/22/magic-leap-announces-layoffs-amid-covid-19-slowdown/?guccounter=1.

world around you, but we augment it with digital content."[51] She says that the content doesn't just sit there: You can interact with it.

Peggy comments that "Covid accelerated AR" and "the technology is solid and it is about aligning real world business needs to the technology." [52] Magic Leap stands by their belief that "AR excels at helping us visualize data in a real-world context and at connecting people remotely -- two common areas of enterprise that have been crying out for innovation." [53]

Some use cases include collaboration (remote work), design/modeling, architecture, engineering, training first responders, urban planning, and healthcare. The device could take the place of bulky equipment. They cite as an example "using AR, technicians would no longer have to try to explain a fault in machinery to an engineer since the engineer would be able to see the issue from their own point of view, and potentially diagnose the problem remotely." [54]

They're working with Lowes and Nvidia, where they can access the digital twin information in their stores and use Magic Leap as a bridge between physical and virtual worlds. They are integrating Nvidia's Omniverse platform with their hardware device. It gives workers access to more data, so that they can be more efficient. The data and the interface you use to access and interact with that data are important. Perhaps this partnership will be the new way people can access that data. To do this, you need a sophisticated tech stack. Omniverse augments "enterprise 3D design and digital twin workflows with real-time collaboration and true-to-reality simulation. It fuses spatial data with other Lowe's data, including product location and historical order information, and pulls all of these sources together into a visual augmented reality (AR) package that can be accessed through Magic Leap 2."[55]

Epic Games (Fortnite)

Epic Games is at the forefront of every conversation surrounding metaverse like experiences. Their competitive advantage
lies in their IP recognition and creation of a social space where events have permeated the fabric of gaming society. Epic's gameplay is social focused. They also have events, concerts (for example with Ariana Grande), activities, and other virtual events with millions of attendees. They are multi-platform and a large percentage of the community can share in those events.

They are developer led with game rules in their battle royale game Fortnite, and the user generated content (UGC) features allow you to create worlds (although you cannot create your own games). They do, however, have a creative mode that is picking up steam. An advantage they have is that developers can create games easily and with high quality graphics. It is easy to see how they could create an IP driven metaverse ecosystem with titles like Fortnite and Rocket League — inventing a strong IP social driven hangout. They call their Unreal Engine "the world's

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[51] WaitWhat. "Masters of Scale : Rapid Response." *Apple Podcasts*, podcasts.apple.com/fr/podcast/rapid-response-why-take-on-turnaround-w-magic-leaps/id1227971746?i=1000501936576.

[52] WaitWhat. "Masters of Scale : Rapid Response." *Apple Podcasts*, podcasts.apple.com/fr/podcast/rapid-response-why-take-on-turnaround-w-magic-leaps/id1227971746?i=1000501936576.

[53] "Augmented Reality 101: The Future of Work and AR for Business." *Homepage*, www.magicleap.com/news/augmented-reality-101-the-future-of-work-and-ar-for-business.

[54] "Augmented Reality 101: The Future of Work and AR for Business." *Homepage*, www.magicleap.com/news/augmented-reality-101-the-future-of-work-and-ar-for-business.

[55] "Magic Leap 2 and Nvidia Partner with Lowe's to Unveil Industry-First Digital Twin." *Homepage*, www.magicleap.com/news/magic-leap-2-and-nvidia-partner-with-lowes-to-unveil-industry-first-digital-twin.

most open and advanced real time 3D creation tool…(enabling) game developers and creators across industries to realize next generation real time 3D content and experiences with greater freedom, fidelity, and flexibility than ever before."[56]

According to Forbes, "Epic is investing in metaverse infrastructure developer Hadean as part of their latest $30 million round of funding, and it could have big implications for the company's future…. It seems Epic wants to scale those events up even further, and make sure its metaverse ambitions are not limited to the 100-player battle royale sum total that we usually see from them."[57] Marc Petit says, "Hadean's computing power will provide the infrastructure that's needed as we work to create a scalable metaverse…the company's technology complements Epic's Unreal Engine by enabling massive amounts of concurrent users and unlocking new tools for creators and developers."[58]

Disney

According to Forbes, "Disney's unparalleled collection of IP, unique brand, and superior content monetization capabilities give it a significant competitive advantage." [59] Disney is going to be in a deep content and licensed IP war with other major film/TV companies in the space—including Warner Brothers Discovery and Paramount, as well as providers of streaming services like Netflix, Apple and Amazon, all of which are also investing heavily in their metaverse strategy.

Disney owns LucasFilm, which it bought for $4.05 billion in 2012.[60] They also own Marvel and Pixar and the rights to some of the most popular IP in the world. They could easily license this IP to gaming companies who have the infrastructure to build interactive virtual worlds—or perhaps they will go down the path of building these virtual worlds for themselves. Disney has been hiring in their department of Next Generation Storytelling and Consumer Experiences. They recently hired Michael White (EVP) and Mark Bozon (VP) to head up the department.

Bob Chapek, CEO of Disney, recently said, "we have something that no one else has, and that's the physical world, a world of our parks. And so, if the metaverse is the blending of the physical and the digital in one environment, who can do it better than Disney?"[61] One can easily see the theme parks becoming more than just physical worlds, but immersive virtual worlds as well where the physical and digital converge into an exceptional story-telling experience.

ByteDance (owner of TikTok)

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[56] *Unreal engine 5*. Unreal Engine. (n.d.). Retrieved October 27, 2022, from https://www.unrealengine.com/en-US/unreal-engine-5

[57] Tassi, P. (2022, October 12). *Fortnite's Epic Games makes a metaverse investment to scale up even further*. Forbes. Retrieved October 27, 2022, from https://www.forbes.com/sites/paultassi/2022/09/23/fortnites-epic-games-makes-a-metaverse-investment-to-scale-up-even-further/?sh=380297122cfd

[58] ""

[59] Trainer, David. "Disney's Strategy Is Working." *Forbes*, Forbes Magazine, 12 Oct. 2022, www.forbes.com/sites/greatspeculations/2019/12/11/disneys-strategy-is-working/?sh=550a23d756b0.

[60] Krantz, Matt, et al. "Disney Buys Lucasfilm for $4 Billion." *USA Today*, Gannett Satellite Information Network, 31 Oct. 2012, www.usatoday.com/story/money/business/2012/10/30/disney-star-wars-lucasfilm/1669739/.

[61] "First on CNBC: CNBC Transcript: Disney CEO Bob Chapek Speaks with CNBC's Julia Boorstin on 'Closing Bell' Today." *CNBC*, CNBC, 9 Feb. 2022, www.cnbc.com/2022/02/09/first-on-cnbc-cnbc-transcript-disney-ceo-bob-chapek-speaks-with-cnbcs-julia-boorstin-on-closing-bell-today.html.

According to Forbes, “what Meta, the parent company of Facebook, is trying to do to dominate the future virtual world called the metaverse in the West, Chinese tech giant ByteDance has been matching with the aim of leading in the East.”[62] They “scored $58 billion in revenues in 2021” and are “assembling a metaverse hardware, content, software and platform lineup similar to that of Meta.”[63]

They bought “Chinese VR headset maker Pico in August 2021 for a rumored jaw-dropping price of around 9 billion yuan ($1.4 billion).”[64] They have “over 600 million Douyin (TikTok's Chinese version) users and ByteDance has conducted massive and expensive campaigns to catapult sales of Pico, with a goal to catch up and eventually surpass Meta’s Quest in shipment.” [65]

They acquired “Chinese virtual social platform PoliQ, which developed the once-popular virtual social platform “you” that allowed users to create their own avatars.”[66] TikTok’s “experience is driven by AI. AI is a powerful competitive advantage for ByteDance.” [67]

With the metaverse experiences in Roblox and Fortnite gaining even more traction, one can’t help but wonder what ByteDance will introduce next that will capitalize on its highly addressable younger audience.

Amazon

Amazon’s competitive advantage is its “flexible technology stack (that) allows it to offer consumers a broader product assortment, greater convenience, and highly competitive pricing. All of which make Amazon a formidable competitor for traditional multi-channel retailers.”[68] While Amazon has a huge role in shopping for physical items, you can only imagine what they can do when they start selling virtual items and virtual replicas of everything they sell. Shopping is going to be a part of the metaverse as the metaverse is where physical and virtual worlds converge. Shopping for virtual items where you also get a physical item, say, via Amazon, is possible. Amazon has the capital and network to create a shopping metaverse experience that is unrivaled by any other.

They recently published an experience called AWS Cloud Quest where an online role-playing game aims to help people build out cloud-computing skills…Users navigate a

[62] Xiang, Nina. “Tiktok Parent ByteDance Follows Meta's Footsteps down Risky Path toward the Metaverse.” *Forbes*, Forbes Magazine, 3 May 2022, www.forbes.com/sites/ninaxiang/2022/04/26/tiktok-parent-bytedance-follows-metas-footsteps-down-risky-path-toward-the-metaverse/?sh=1336b112395e.

[63] “”

[64] “”

[65] “”

[66] “Tiktok Owner ByteDance Dives Deeper into the Metaverse with VR Start-up Deal.” *South China Morning Post*, 29 June 2022, www.scmp.com/tech/big-tech/article/3183208/bytedances-metaverse-investments-continue-acquisition-chinese-virtual.

[67] Simone Smerilli. “How TikTok Is Conquering Social Media through AI and Psychology.” *Simone Smerilli*, Simone Smerilli, 25 Mar. 2022, www.simonesmerilli.com/business/tik-tok.

[68] Soares, D. (2019, November 25). *Four ways amazon is beating retailers*. MarkLogic. Retrieved November 3, 2022, from https://www.marklogic.com/blog/amazon-beating-retailers/

virtual city, helping its denizens solve IT issues related to the cloud while earning points for completing simulations and puzzles."[69]

Google

Sundar Pichai, Google's CEO said in a 2021 interview with Emily Chang (Bloomberg) that "It's always been obvious to me that computing over time will adapt to people more than people adapting to computers. You won't always interact with computing in a black rectangle in front of you. So, just like you speak to people, you see, and interact, computers will become more immersive. They'll be there when you need it to be. So, I have always been excited about the future of immersive computing, ambient computing, AR"[70]

Google's AR/VR website says that "AR and VR bridge the digital and physical worlds…AR dramatically expands the way our devices can help with everyday activities like searching for information, shopping, and expressing yourself. VR lets you experience what it's like to go anywhere."[71] According to The Verge, Google is building an AR headset called Project Iris.[72]

Google's competitive advantage is search and information. Knowledge is power. They are investing heavily in MR and AI. They have valuable assets like search, Google Maps, cloud computing, Gmail, and digital twins of the world. They have a number of innovation projects ongoing that are focused on the metaverse. Searching for information in 3D presents multiple opportunities to improve the user experience and provide easier and more immersive access to data and content.

Conclusion

The metaverse is inevitable. All of the companies I researched are investing in it in some form, and they have high expectations that coming technological changes will substantially impact how we work, communicate, engage in economic transactions and live our lives. While some companies have been criticized in the media or by shareholders for overinvesting in their metaverse strategy, behind the scenes they are creating the future—the future of daily digital interaction, social media, entertainment, and technology.

Although there are differences in strategy and focus, my research reveals a number of common themes running across these companies that are participating in what will be a technological revolution. These include:

- The companies recognize and have embraced the substantial changes that people will experience moving from a 2D interface to a 3D world.
- The current public narrative is that the metaverse is being oversold. This narrative is being dominated by the perspective and soundbites from a few major players and not the ecosystem as a whole. When you pan out and look at how hundreds of companies

[69] Annierpalmer. (2022, March 15). *Amazon just introduced a bizarre metaverse-like game to train people how to use AWS*. CNBC. Retrieved November 3, 2022, from https://www.cnbc.com/2022/03/15/amazon-launches-metaverse-like-game-to-train-people-how-to-use-aws.html

[70] *Sundar Pichai thinks of the metaverse as more immersive computing with Ar*. 9to5Google. (n.d.). Retrieved November 3, 2022, from https://9to5google-com.cdn.ampproject.org/c/s/9to5google.com/2021/11/17/sundar-pichai-google-metaverse/amp/

[71] Google. (n.d.). Google AR & VR | Home. Retrieved November 3, 2022, from https://arvr.google.com/

[72] Heath, A. (2022, January 20). *Google is building an AR headset*. The Verge. Retrieved November 3, 2022, from https://www.theverge.com/2022/1/20/22892152/google-project-iris-ar-headset-2024

are creating the future of technological innovation, you see many different strategies and visions at play—not one overarching vision.

- Companies have different views on the timeline of impact, but incremental changes will be made in the next five years that will forever alter the way we live and interact with technology, and these changes will gain momentum and ultimately prove to be revolutionary.
- The biggest barrier to achieving a metaverse that fundamentally alters the way we experience technology is the advancement of the systems and hardware needed to enable it and make it accessible and affordable. In particular we need improved performance in CPUs, GPUs, AR glasses, and VR glasses. In addition, the metaverse will be enhanced by the next generation of communications technology as we move beyond current Wi-Fi protocols and 5G.
- Companies have been making progress on some of the hardest problems with headsets, like rendering high fidelity graphics, so that you feel immersed and comfortable. Getting headsets in a form factor so you can wear it for extended periods is challenging and there are still CPU and GPU barriers.
- It is likely that within the next two decades (possibly sooner), people will only need one device that allows for complete immersion in the physical world, and complete immersion in the digital world, and everything in between.
- When we get to the point that the hardware feels as intuitive as an iPhone and is socially acceptable to wear, the metaverse will take-off.
- There is an ongoing debate about whether the core interface will be AR versus VR. It is possible that AR takes off to a point where it occupies the space for a long period, but it is also possible that VR becomes easy enough to integrate into our lives. However, the metaverse is not a device, and it is not solely AR or VR.
- There will be a battle between companies that could seek to create a closed ecosystem like Apple has with IOS, and those companies like Meta, Animoca Brands and Gala Games who advocate for an open metaverse.
- Expect more mergers and acquisitions in the gaming, VR, AR, and AI space.
- Expect creator tools to advance in ease of use and graphics to the point where an average person can create an exceptionally high-quality movie or story.
- AI and machine learning will change the nature of immersive experiences. Today the 2D internet is asynchronous and there is latency in the response. A fundamental characteristic around improved digital experiences is that they will run in real time. Machine learning will help make the experience high utility and high value. As AI and headsets evolve, it will substantially impact not only our social lives but also business development and manufacturing. Things that are constructed will be visualized and simulated and this will improve products and reduce costs.
- Digital rights are evolving and could be an important metaverse component. Many companies believe there needs to be a mechanism to account for what users create, so that they can take it with them as they move through experiences. They believe that without those developments users will spend less time in the metaverse because it will be important to them to keep what they create. Whether or not this becomes a component of the wider metaverse remains to be seen.

- There will be new types of content that will flourish in the metaverse and will drive users to it. Current content (Film/TV, etc.) will continue but will also be impacted. Companies will start to merge the physical and digital worlds to create more immersive content, but sitting back, relaxing, and watching passively will always be at play.
- In regard to content, expect to see more shows become games and games become shows. Get ready for companies to seek more utility in their content. A T.V. the show may not be enough. What are other ways you can engage the audience? Expect to bring stories with you to more places.
- Most companies cite Roblox and Fortnite as having the most advanced metaverse platforms, but there are multiple players engaged in metaverse development and who wins out is an open question.
- Younger generations are starting to care as much about their digital identities as they do their physical ones.
- There will be a fundamental shift in digital advertising because consumers will have more choice about the brands they interact with versus the current environment where the platforms and algorithms bombard them with targeted ads.
- There are ways the metaverse will make interacting with one another safer (personal boundaries, muting people, blocking people) but there is also a danger of privacy and surveillance. Companies and governments need to get involved to make it a safe place.
- Games and gamers have always been at the forefront of innovation and adoption, and these executives do not expect the metaverse to be different. Gamers are used to interacting in virtual spaces, onboarding into 3D spaces, and interacting with technology in the most immersive way.
- The digital world needs to augment the physical world. There needs to be some added benefit to being there or else people will not go.
- Many companies question the utility of NFT's that do not either provide a community, a gateway to experience, or a tangible benefit. Others believe that the digital wallet has its own value.
- Content creation companies are in trial-and-error mode with immersive content, VR content, and NFTs. The goal is not to immediately monetize but to figure out what works.
- Web3 and metaverse need to be separated. They are very different concepts.
- Diversity and inclusion as well as children's protection need to be at the forefront of every company's strategy. We need to see more women in positions of power in technology companies. Right now, there is an imbalance of representation and this needs to change.
- Technology can be neutral—how we use it is what matters.

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