

METAVVERSE: LIVING THE FANTASY

KGI Securities (Singapore) Pte. Ltd.



kgiworld.sg/research



6202 1190



sgp.research@kgi.com



KGI Securities (Singapore)



METaverse: A NEW CHAPTER UNFOLDS

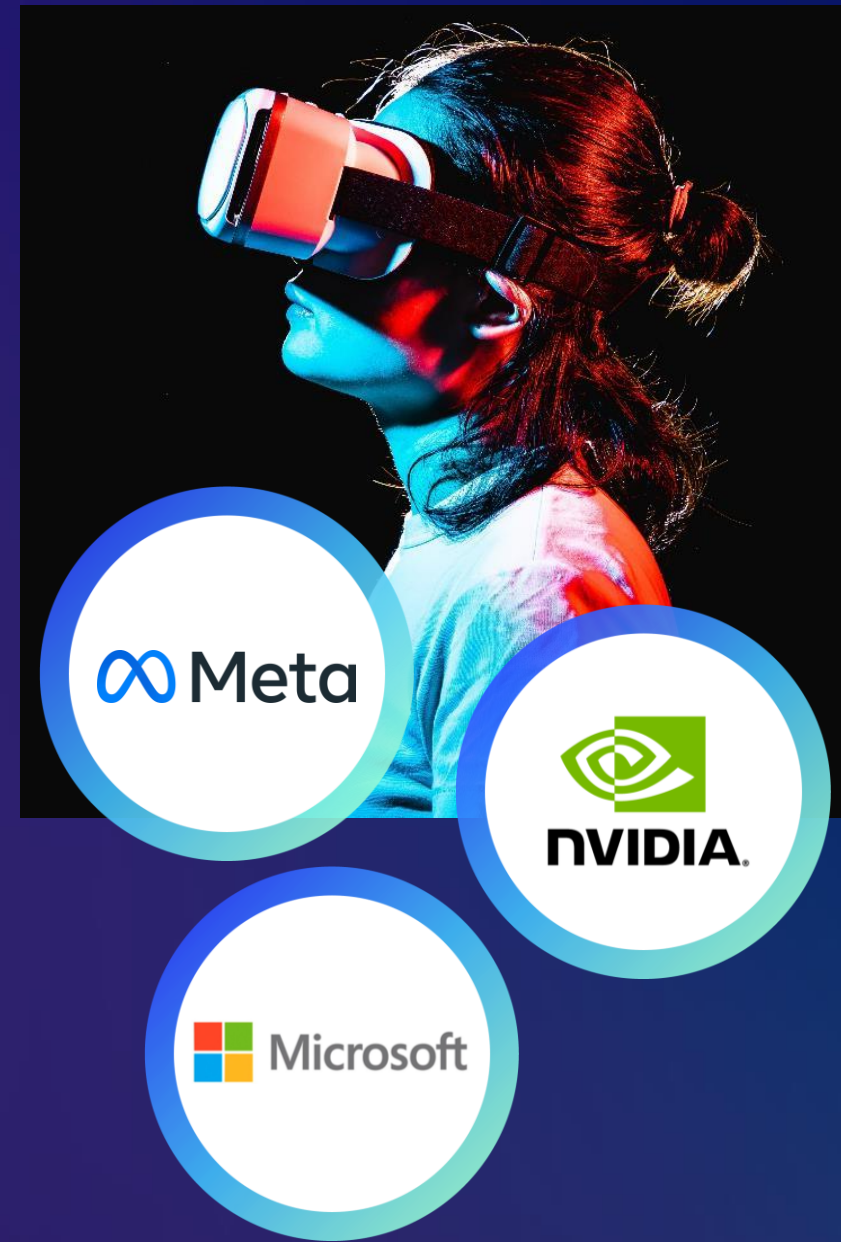
WHAT IS IT?

The **metaverse** is a hypothesized iteration of the internet, supporting persistent online 3-D virtual environments through conventional personal computing, as well as virtual and augmented reality headsets.

Everyone wants a piece of the pie.

The recent change of Facebook's name to Meta Platforms, proclaiming the metaverse as its core business development in the future, likely sowed the seeds for the recent metaverse hype.

Meanwhile, other tech giants such as Microsoft and Nvidia are developing applications to incorporate the metaverse concept as well.



THE SEVEN LAYERS OF THE METAVERSE



THE SEVEN LAYERS OF THE METAVERSE

US-listed Companies

Singapore-listed Companies

Experience

Microsoft, Meta Platforms, Roblox

AlphaDX, Vividthree

Discovery

Microsoft, Meta Platforms, Roblox

AlphaDX, Vividthree

Creator Economy

Microsoft, Meta Platforms, Roblox

AlphaDX, Vividthree

Spatial Computing

Microsoft, Meta Platforms, Roblox, Unity

AlphaDX, Vividthree

Decentralization

Roblox

Vividthree, OIO

Human Interface

Microsoft, Meta Platforms

AlphaDX

Infrastructure

Nvidia, AMD

N/A



FRAMEWORK

There are currently seven interdependent components which lay the foundations of the metaverse, namely experience (content and services), discovery, creator economy, spatial computing, decentralization, human interface, and infrastructure.

EXPERIENCE

- Tangible layer, providing users an immersive experience through the dematerialization of physical space, distance, and objects.
- Examples are through the usage of VR sets, where users can enter the 3D world and participate in activities the real world is unable to offer.

DISCOVERY

- This layer is the gateway which links users to experiences.
- The discovery function to metaverse is like a browser to internet, where operators can promote their offerings on this layer and connect to interested parties.

CREATOR ECONOMY

- This layer is a toolbox for creators to create content or monetized assets in the metaverse.
- Similar to companies or individuals setting up an online shop on web malls such as Amazon or Taobao, users can use graphic and design tools to customize their creations.

SPATIAL COMPUTING

- This layer is a system which builds 3D objects and compute object movements. In short, this is the underlying algorithm which upholds the whole metaverse.

FRAMEWORK

DECENTRALIZATION

- Blockchain is a database with no central authority, and it forms the core of decentralization, via outlets such as cryptocurrencies and NFTs.
- Users can freely develop, use, share, and terminate digital assets.
- Benefits of decentralization include:
 1. Providing a trustless environment
 2. Improving data reconciliation
 3. Reducing points of weakness in systems where there may be too much reliance on specific actors
 4. Optimize resource distribution

HUMAN INTERFACE

- This layer is the hardware through which users access the metaverse.
- Currently, the most common gear are VR headsets and smart glasses. However, in the foreseeable future, we could see more technological savvy portals such as implanted devices.

INFRASTRUCTURE

- This layer includes connectivity, semiconductor and cloud platforms. 3D graphics are the basic building blocks of the metaverse, which require high speed of network connection, greater power of computing and larger storage of data.
- The new wave of metaverse will accelerate the upgrading of network (5G to 6G), demand for chips with ultra-speed processing power and cloud systems handling complicated data computing.

MORE ABOUT DECENTRALIZATION

	CENTRALIZED	DISTRIBUTED	DECENTRALIZED
Network/hardware resources	Maintained & controlled by single entity in a centralized location	Spread across multiple data centers & geographies; owned by network provider	Resources are owned & shared by network members; difficult to maintain since no one owns it
Data	Maintained & controlled by central entity	Typically owned & managed by customer	Only added through group consensus
Solution components	Maintained & controlled by central entity	Maintained & controlled by solution provider	Each member has the exact same copy of distributed ledger
Control	Controlled by central entity	Typically, a shared responsibility between network provider, solution provider & customer	No one owns the data & everyone owns the data
Example	ERP system	Cloud computing	Blockchain

MORE ABOUT DECENTRALIZATION

CRYPTOCURRENCIES

- A cryptocurrency is a digital or virtual currency that is secured by cryptography, which makes it nearly impossible to counterfeit or double-spend.
- Many cryptocurrencies are decentralized networks based on blockchain technology—a distributed ledger enforced by a disparate network of computers.
- This decentralized structure allows them to exist outside the control of governments and central authorities.



NFTS

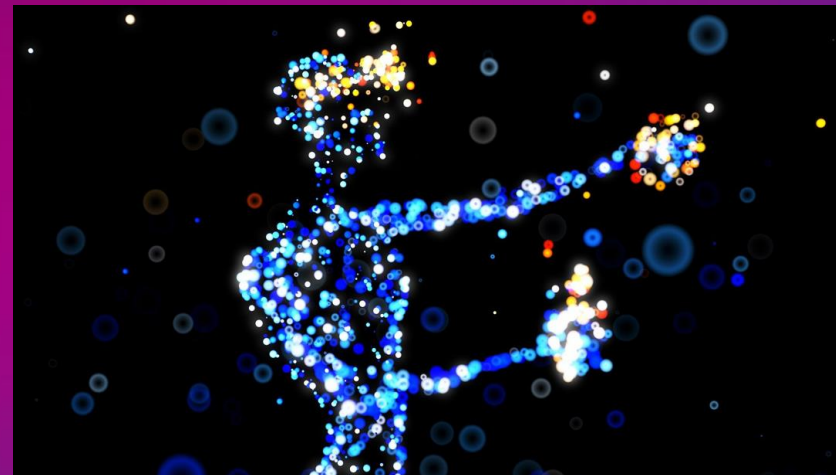
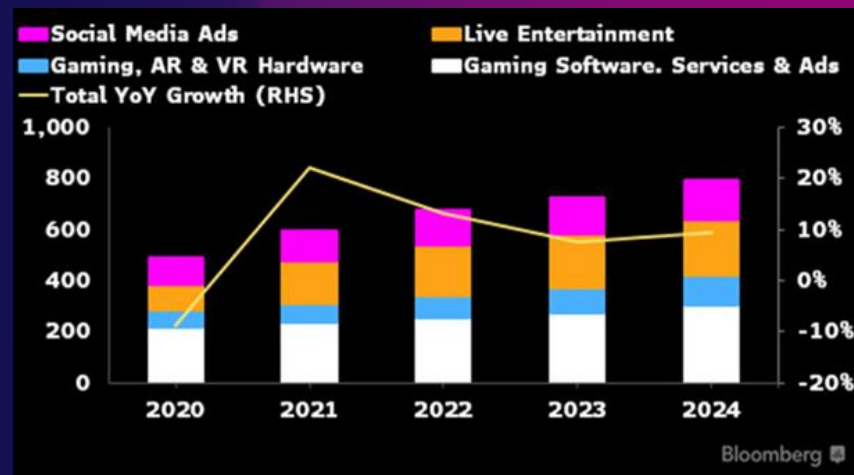
- Non-fungible tokens or NFTs are cryptographic assets on blockchain with unique identification codes and metadata that distinguish them from each other.
- NFTs can be used to represent real-world items like artwork and real-estate, and can also be used to represent people identities, property rights, and more.
- NFTs' key function is authenticating and proving ownership over digital assets, which would enable users to be a stakeholder of their own avatar or virtual world. In an NFT-powered metaverse, crypto is all but set to become a major payment option for the metaverse.



SECTOR OUTLOOK

MIGHTY AND GROWING

- Bloomberg Intelligence estimates that the market size could reach US\$800bn by 2024, vs about US\$500bn in 2020, representing a CAGR of 13.1% over the five-year span.
- However, this is only representative of the primary market for online game makers, gaming hardware, live entertainment, and social media. While all these represent crucial parts of the ecosystem, the longer-term metaverse would include relevant computing, networking, and payments companies as part of its infrastructure.
- The CAGR of related business is forecasted to range from 30% to 50% in the next five years.



STOCKS TO WATCH

WE HIGHLIGHT THE FOLLOWING U.S. AND SINGAPORE-LISTED STOCKS RIDING ON THE METAVERSE TREND

Company	Bloomberg Ticker	Price (Lcl curr)	Mkt Cap (US\$m)	Share Price Change (YTD)	Role in the metaverse	Pages
US		<i>Prices as of 21 December 2021</i>				
META PLATFORMS-A	FB US	325.45	905,324	19.1	Social media platform and VR headsets	10
NVIDIA CORP	NVDA US	277.19	692,975	112.3	Produces VR related hardware and software	13
ROBLOX CORP - A	RBLX US	98.69	57,125	N/A	Online glame platform and game creation system	12
MICROSOFT CORP	MSFT US	319.91	2,401,878	43.8	Designs GPUs for the gaming and professional markets	11
Singapore		<i>Prices as of 21 December 2021</i>				
ALPHA DX GROUP L	ALEN SP	0.21	39	N/A	Integrating Expanded Reality technology for the education sector	14-15
OIO HOLDINGS LTD	OIO SP	0.47	64	141.0	Provides blockchain services	16-17
VIVIDTHREE HOLDI	VTH SP	0.08	21	28.8	Provides immersive media services and NFTs	18-19

LATEST APPLICATION OF THE METAVERSE



- Oculus Quest is a virtual reality (VR) headset developed by Oculus, a division of Meta Platforms.
- It is a standalone device that can run games and software wirelessly under an Android-based operating system.



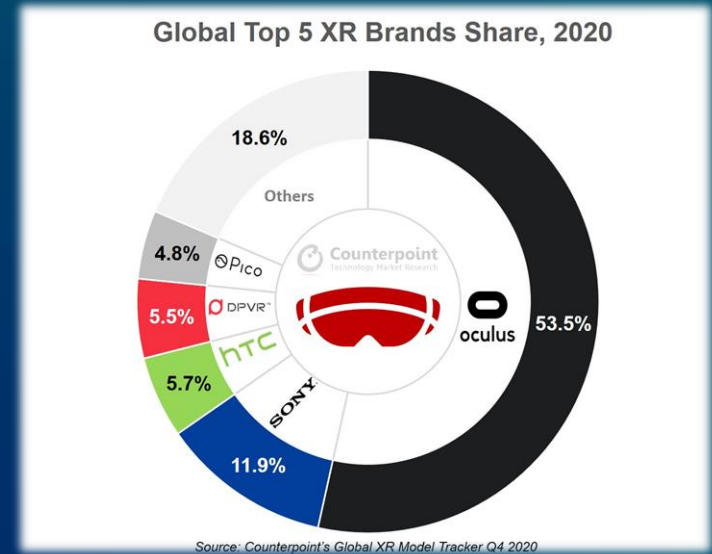
Multi-player function; Entertainment

- Users can connect with friends and engage in multi-player games such as dance-off and escape room challenges, or even a fun group workout.
- Users can also engage in virtual entertainment, such as live concerts and worldwide events.



Horizon Workrooms

- Workrooms is a collaboration experience that enables individuals to work in the same virtual room, regardless of physical distance.
- It is designed to improve teams' ability to collaborate, communicate, and connect remotely, through the power of VR.



LATEST APPLICATION OF THE METAVERSE



Mesh for Teams

- Users can connect and collaborate with a feeling of presence through personalized avatars and immersive spaces.
- With a new generation of 2D and 3D meeting experiences, Mesh enables brainstorming, creativity and fostering of serendipitous connections within teams.



Mesh App for HoloLens

- Microsoft has developed HoloLens, a pair of mixed reality smart glasses.
- Users can use the Mesh App and connect with colleagues and co-create in real time, sharing and annotating content that persists between sessions.



AltspaceVR

- Host meetings, town-halls, and work gatherings using AltspaceVR, the premier place for virtual meetups.



LATEST APPLICATION OF THE METAVERSE



LAYERS
1 – 5

- Roblox’s ‘Imagination Platform’ allows users to develop or play millions of 3D online games.
- The site allows users to “Imagine, socialize, chat, play, create, interact and relate with others in many ways.”

Latest development

- Roblox plans to spruce up player avatars, introduce new in-game monetization streams and streamline the experience for developers dreaming up the user-generated content.
- NIKELAND – A Nike collaboration which features the following: 1. Digital showroom 2. Creators can easily design their own mini-games from interactive sports materials 3. Visitors can take advantage of accelerometers in their mobile devices to transfer offline movement to online play.

Human-like avatars

- Layered clothing, a visual update that will make avatar outfits more realistic and dynamic, aiming to inject both more customization and more realism into the blocky Lego-like looks that are synonymous with the platform now.



NFT concept

- Introduce limited edition items, an interesting new way for people to make money (in the form of Robux, which can be traded for actual bucks)
- Creators can also generate money off subsequent sales by enabling royalties — a perk that Roblox’s in-game items will share with some NFTs.

LATEST APPLICATION OF THE METAVERSE



- Nvidia designs graphics processing units (GPUs) for the gaming and professional markets, as well as system on chip units for the mobile computing and automotive market.
- Besides offering GPUs and chip unites, Nvidia offers the **NVIDIA Omniverse**, which is an easily extensible, open platform built for virtual collaboration and real-time physically accurate simulation. Creators, designers, researchers, and engineers can connect major design tools, assets, and projects to collaborate and iterate in a shared virtual space.

Game Development; Architecture, Engineering & Construction

- Virtual platform built for collaboration and real-time photorealistic simulation.
- Game developers/Project teams can now maximize productivity, enhance communication, and boost innovation while collaborating on the same 3D model from anywhere.

Scientific Visualization

- Brings researchers into a shared virtual space so they can view, analyze, discover, and publish their scientific breakthroughs faster through real-time collaboration and simplified workflows.

Manufacturing

- Virtual platform built for collaboration and real-time photorealistic simulation.
- Project teams can now connect every phase of their process — from ideation and conceptual design to production automation on the factory floor.

LATEST APPLICATION OF THE METAVERSE



LAYERS
1 – 4,6

Alpha DX's Ubiquitous Learning Experience Platform (ULEP in Metaverse) provides a personalized, engaging and expanded learning experience

Academic Solutions

- Integrating Extended Reality (XR) technology to create an immersive and seamless learning experience.
- Aims to serve a diversified customer based from government agencies, education institutions and private enterprises.

Enterprise Solutions

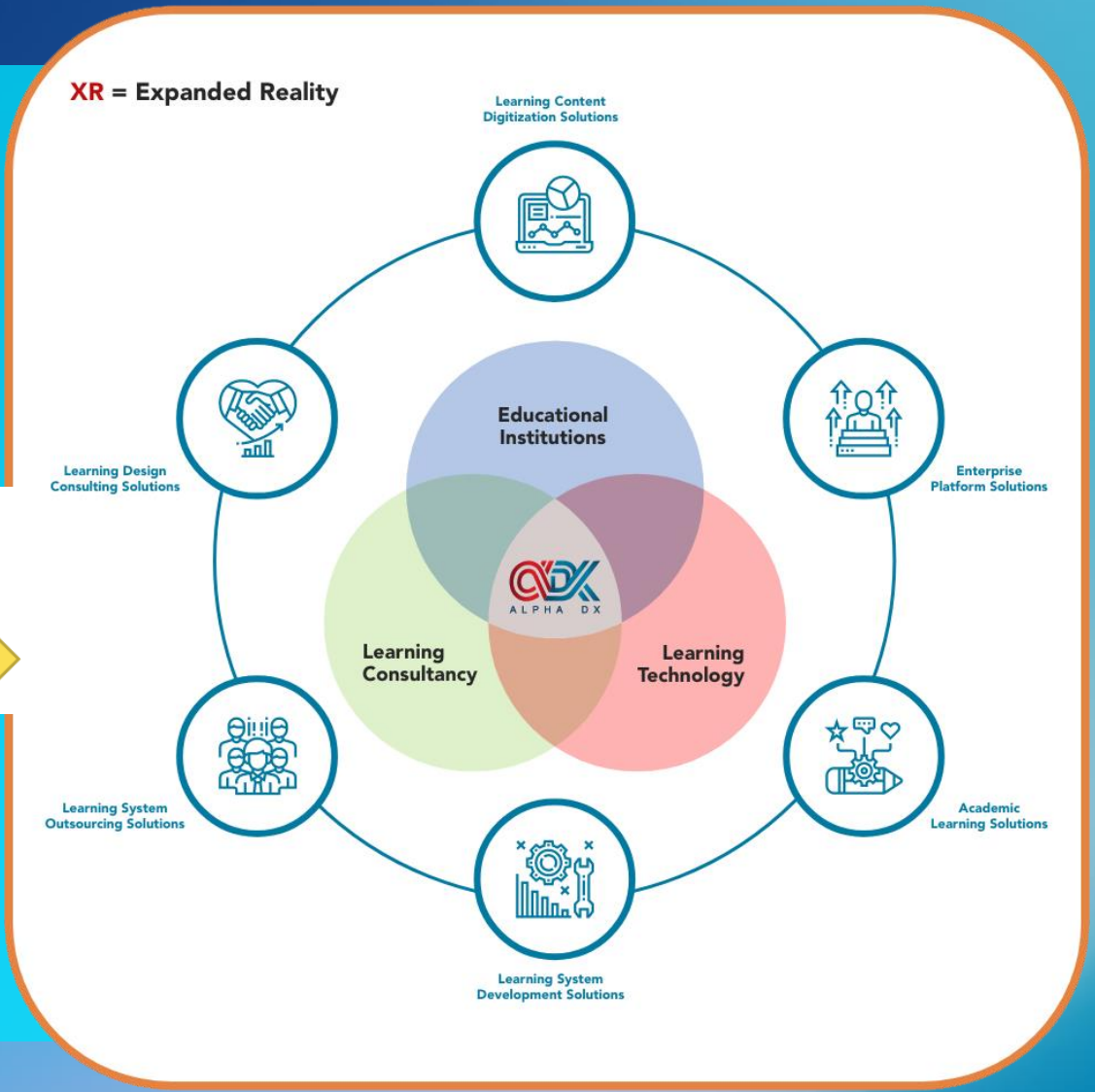
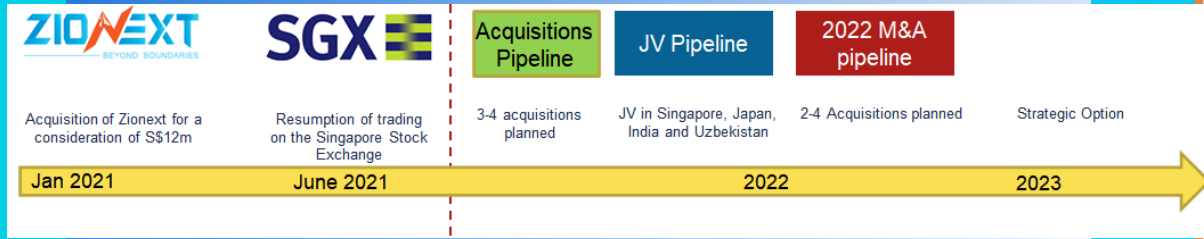
- Provide digital training content to corporations and educational institutions to help achieve business goals.

Community Solutions

- Alpha DX's Community Guardian solution enables the community-at-large to detect and report domestic violence incidents, and provide help to victims more quickly.



ALPHA DX



LATEST APPLICATION OF THE METAVERSE



- More than 90% of the revenue came from Blockchain and its related businesses in FY2020.
- The company was previously known as DLF Holdings until QRC Pte Ltd bought a 64% stake in Nov 2019 and the company name change was approved in June 2020.

Financial Services Business

- New business to satisfy unmet information needs in relation to crypto-asset investment for traditional investors and high-net-worth individuals (still in planning phase)

Consulting Business

- Strategy and technology consulting services mainly targeting blockchain finance projects (including software development services)
- Incubation/Acceleration consulting

Staking Business

- B2C staking platform business through digital wallets with good security features and UI
- B2B staking software sales business

LATEST APPLICATION OF THE METAVERSE



Proof of Work (PoW)

vs

Proof of Stake (PoS)

The ability to mine is determined by the computational power of each miner.

The ability to mine is determined by how many tokens of this currency the user owns.

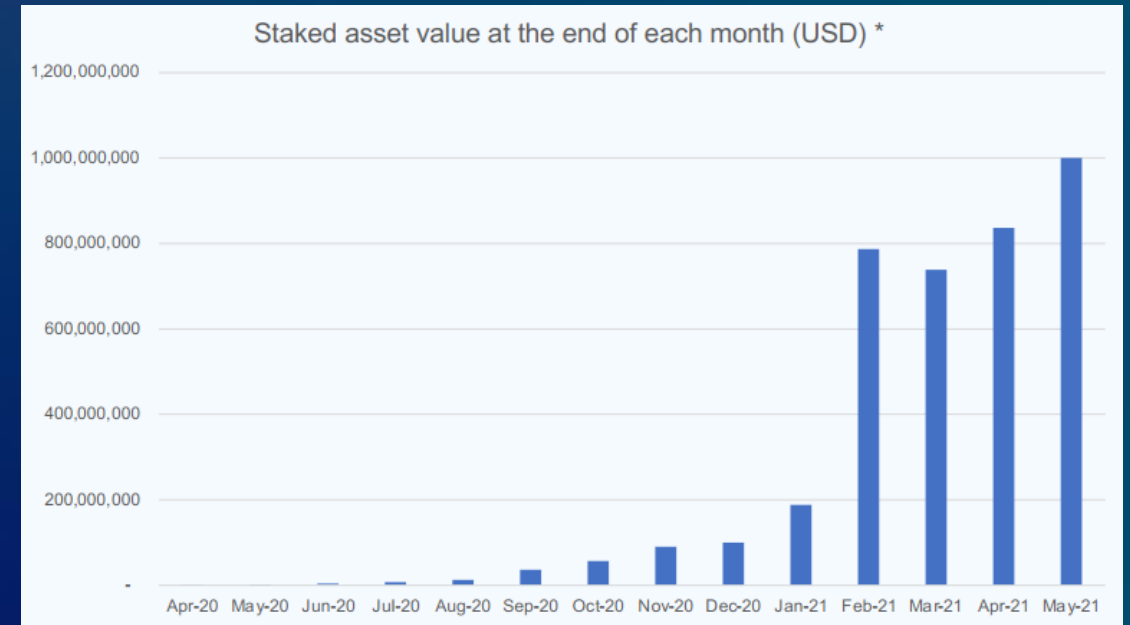
A reward is given to the miner who solves each block.

The miner does not earn rewards but is paid with network fees.

Hackers need 51% of the network computing power to add a block and to execute a 51% attack – which is highly unlikely (but not impossible).

Hackers would need to own 51% of all the cryptocurrencies on the network to execute an attack, which is almost impossible.

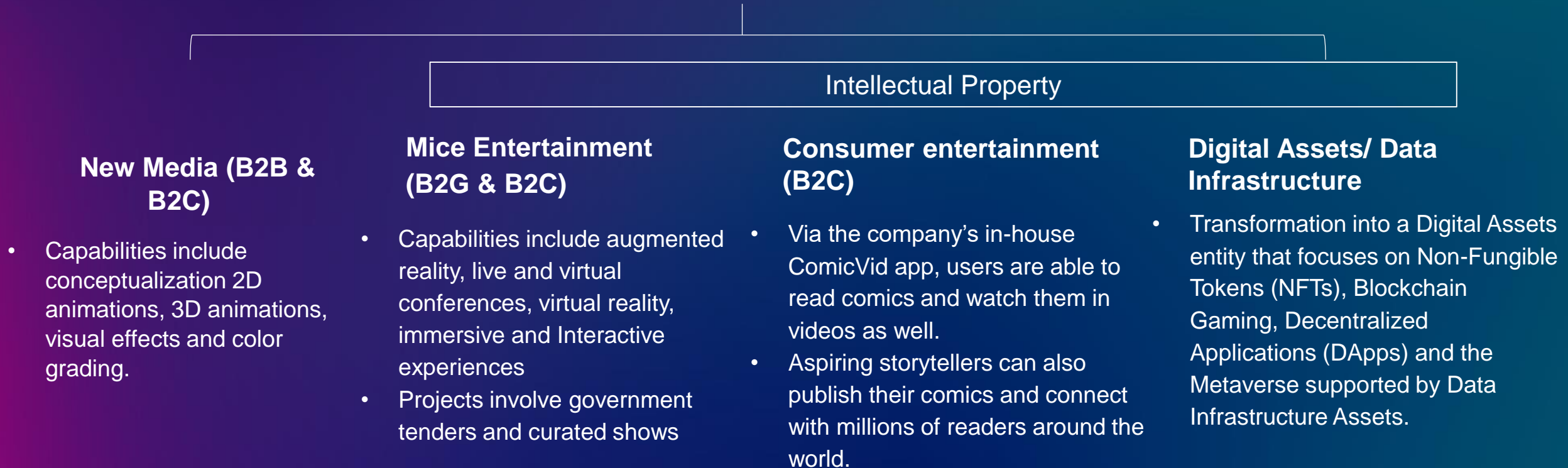
OIO's staking assets **exceeded US\$1bn as of 31 May 2021**. The company receives 0.3%-0.5% of the total staking assets as commission, which OIO recognises as revenue.



LATEST APPLICATION OF THE METAVERSE



Vividthree is Singapore's first-listed Immersive Digital Content Production Powerhouse specialising in virtual reality, visual effects and computer-generated imagery with strong network presence in Singapore, Malaysia and China.



LATEST APPLICATION OF THE METAVERSE

LAYERS
1-5

Upcoming involvement in the metaverse: Leveraging on the 3 pillars of expertise

- Vividthree announced in October this year that it is in preliminary discussions with GammaR Pte Ltd, which is involved in NFT gaming.
- SkyArk Chronicles is a first joint project between GammaR and SkyArk Studios. SkyArk Studios is one of the nine companies which made it to Season 3 of the Binance Incubation Programme.
- The Binance Incubation Program provides and support the selected companies with value-added services such as PR, marketing and legal solutions.
- Leveraging on Vividthree's current expertise in new media and mice entertainment, the collaboration with GammaR is a first step into the metaverse universe.

The first debut: NFT digital comic collectibles

- Vividthree announced in early December that it is developing digital collectibles of the characters of its popular webcomic 'Silent Horror'.
- Characters will be transformed into digital collectibles on the blockchain for the comic fans and NFT collectors to purchase.
- Vividthree is the Intellectual Property ("IP") owner of 'Silent Horror', a webcomic series with a supernatural horror theme that has amassed over 100 million views online since February 2015.



INVESTING IN THE METaverse:

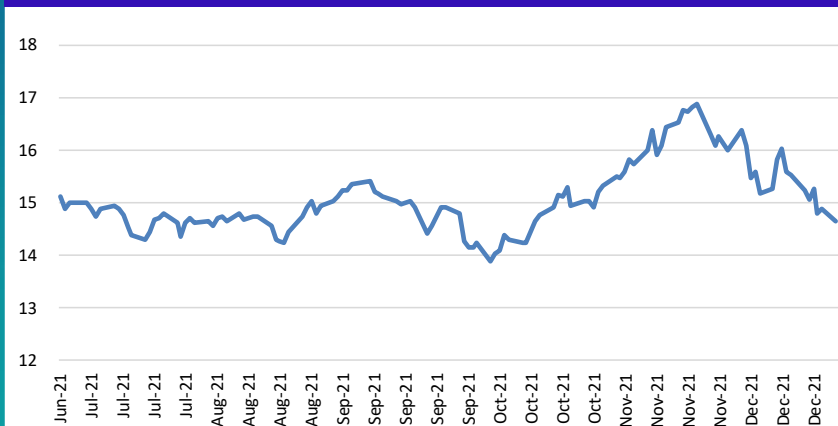
Roundhill Ball Metaverse ETF (META US)

- As the metaverse involves an integrated value chain from the upstream of content providers to the downstream of infrastructure, it may be difficult to choose a winner among all.
- Therefore, we recommend diversifying into all components, via the thematic **ETF Roundhill Ball Metaverse ETF (META US)**, which covers key companies involved in the metaverse.
- The ETF tracks the Ball Metaverse Index which is the first index globally designed to track the performance of the metaverse. The Index consists of a tiered weight portfolio of globally listed companies which cover the above-mentioned framework.



META FACTSHEET

1 Year Performance



The Roundhill Ball Metaverse ETF is an exchange-traded fund incorporated in the US. The fund seeks to track the performance of the Ball Metaverse Index, which is comprised of leading companies across major categories of the Metaverse. The Index is developed and maintained by an Expert Council whose specialized knowledge reflects the range of relevant sectors.

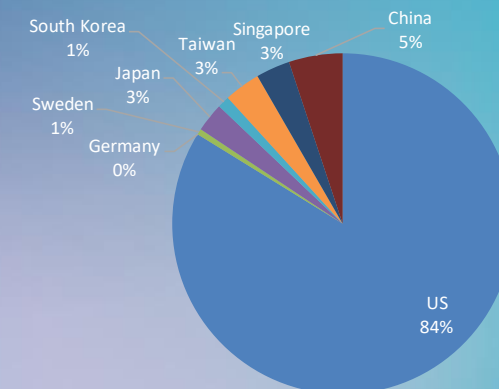
	YTD	1Y	3Y
Commulative Returns (%)	NA	NA	NA

Currency	USD
Exchange	NYSE Arca
Net Total Assets (mn)	701
Net Expense Ratio	0.75
P/E	43.1
P/B	7.8
3-month daily avg turnover (mn)	12,358,310
1-month share price performance (%)	13.1

Holdings

SYMBOL	HOLDING	% Assets
NVDA US	NVIDIA Corp	10.1
RBLX US	ROBLOX Corp	9.7
MSFT US	Microsoft Corp	6.9
U US	Unity Software Inc	6.2
FB US	Meta Platforms Inc	5.7
ADSK US	Autodesk Inc	4.1
AMZN US	Amazon.com Inc	3.9
700 HK	Tencent Holdings Ltd	3.6
QCOM US	QUALCOMM Inc	3.5

Country Allocation



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