

Tracking the Long-Term Investment Opportunities within the Metaverse

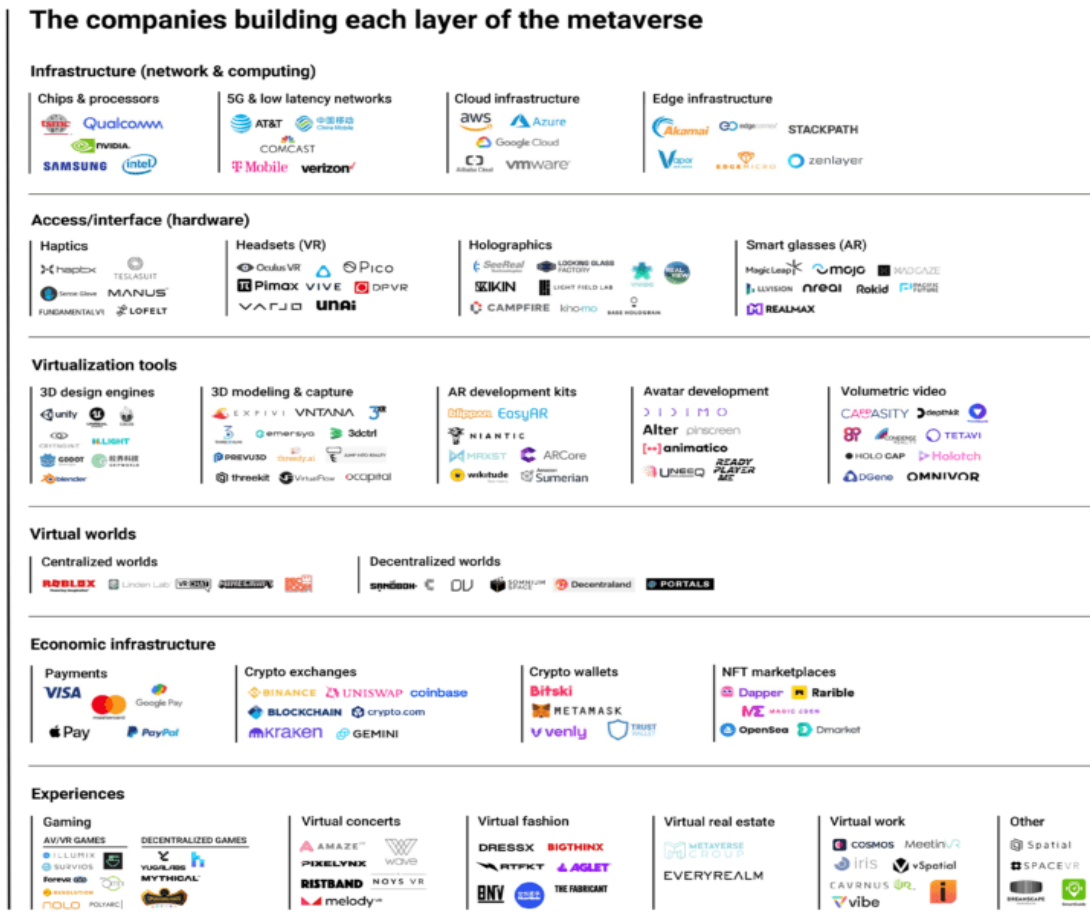
December 2022

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What is the Metaverse?

The metaverse is the concept of shared worlds driven by virtual products and digital experiences that are highly immersive and interactive. As a result, the metaverse is not a single technology. It is a vision for the future of the internet that will be built on top of technologies like AR/VR, AI, digital twin, game engines, and more. CB Insights has mapped the metaverse landscape by breaking down the opportunity into distinct technological layers and highlighting the key vendors set on making the metaverse a reality.



CBINSIGHTS Note: The infrastructure and economic infrastructure layers are massive markets with thousands of startup and corporate vendors powering everyday applications not exclusive to the metaverse.

We've also established a simpler 3-layer framework for thinking about the metaverse opportunity:

- **Infrastructure:** This is the foundational layer that includes tech solutions with broad applications, such as the Infrastructure and Virtualization Tools categories from the market map above.
- **Interface:** This includes the software and hardware solutions through which users will be able to access and interact with the metaverse. Access/interface and virtual worlds categories form this layer.
- **Economy:** This layer includes the products, services, and experiences that users can access in the metaverse. The Economic Infrastructure and Experiences categories from the map above are included here.

Why does it matter?

The metaverse opportunity could be as big as \$1.5T by 2030, according to CB Insights' market sizing tool. This cannot be overlooked by enterprises or individuals. Tracking the metaverse means tracking a range of disruptive trends that will shape the future of the internet and virtual experiences.

In recent years, the metaverse has also seen major tailwinds:

- Global internet users are spending an average of nearly 7 hours a day online.
- Active video gamers worldwide are expected to reach an all time high of over 3B by 2023.
- A global pandemic has forced many businesses to prioritize digital strategy

These trends are already shaping the metaverse. For example, gaming companies like Roblox and Epic Games are building out new experiences that bring internet entertainment beyond games, including hosting virtual concerts or releasing virtual fashion items with major brands as partners.

Big tech players like Qualcomm, Apple, Meta, and Microsoft have all expressed interest in developing AR experiences that will make internet access natural and seamless. Meanwhile, a number of startups are developing software solutions to simplify metaverse building, from creating virtual experiences for the future of work to designing 3D content for ads.

Whether or not the metaverse will ultimately be a fully virtual world, the tech solutions that companies are developing as part of this push will significantly impact the way we interact with digital experiences.

Who's active?

Using CB Insights' proprietary datasets such as acquisitions, investments, partnerships, patents, and more, we determined which enterprises are most actively investing resources in the metaverse.

For many enterprises, these investments are venture capital. In 2022, Microsoft made a number of metaverse-related bets, with gaming emerging as a primary focus. This includes early-stage rounds to stealth game development startup Kooply and Inworld AI, a generative AI startup helping game developers build intelligent characters.

Several gaming incumbents are also making metaverse venture bets. Tencent leads the pack with over 100 metaverse-related investments since 2021. Similarly, major game studios like Ubisoft and NetEase are also investing in metaverse startups. In 2022, Ubisoft participated in a \$8M seed round to Gadsme, a startup building in-game ads to help developers monetize entertainment content.

Metaverse-related acquisitions have also been heating up for a number of companies. Qualcomm has acquired XR development startups like Wikitude, Clay AIR, and Augmented Pixels, which aligns with Qualcomm's internal XR development platform, Snapdragon Spaces. Meanwhile, Meta Platforms has been on a shopping spree in the VR gaming space, having purchased Downpour Interactive, BigBox, Ready at Dawn, Sanzaru, and Camouflaj since 2020.

In addition to inorganic growth, it's also important to keep an eye on companies' internal metaverse R&D. For example, Nvidia recently released its Omniverse platform, which will be used to build virtual worlds and digital twins in the metaverse. In July 2022, Adobe announced major updates to Adobe Substance 3D, an internal set of 3D content creation tools that could be used in gaming, AR, VR, and more.

While many of these companies' core products and services are different, they are all positioning themselves to capitalize on the metaverse's potential.

What are the key themes?

Expect continued progress in the tools developers will use to build metaverse experiences. This includes game design engines, 3D modeling software, AR developer tools, and more.

For example, Epic Games' Unreal Engine is used to develop its internal suite of games, such as Rocket League and Fortnite. It's also the backbone of a host of high-profile games made by other studios.

In 2021, AR unicorn Niantic announced the launch of its developer platform, Lightship. This play could expand Niantic's revenue stream beyond the competitive gaming market — its 2016 release of Pokémon GO remains its most successful product to date.

Another key theme will be advancements in computing power and processing to support the big data flows and low latency demanded by the metaverse. Tech emerging within categories such as chips & processors, 5G, cloud infrastructure, and edge infrastructure, will prove vital to creating a seamless, lag-free experience in the metaverse.

For example, Qualcomm claims its Snapdragon chips have been used in over 50 AR/VR devices, including popular VR headsets like Meta's Oculus and HTC Vive. Qualcomm also recently announced the launch of its \$100M Snapdragon Metaverse Fund, which will invest in the extended reality (XR) space.

Expect non-tech players to enter the metaverse economy. Today, fashion brands are experimenting with developing metaverse experiences to expand customer reach and develop new revenue streams.

Nike, for instance, acquired virtual sneaker company RTFKT, and partnered with Roblox to build "Nikeland" — a world where users can buy Nike outfits for their avatars. Similarly, Balenciaga released virtual fashion brands in Fortnite, and a digital Gucci "bag" sold for over \$4,000 on Roblox in May 2021.

Looking ahead

CB Insights is using its private market database to keep an eye on emerging metaverse players that are most likely to capture the trillion dollar market. By using our proprietary data and scoring methodologies, we are keeping tabs on future metaverse unicorns that could one day go public or become attractive acquisition targets for existing players.

Introducing the Nasdaq CB Insights Metaverse Index

The Nasdaq CB Insights Metaverse Index (NCMETV) was launched on July 29, 2022 at a base value of 1,000. It is designed to track the performance of a selection of companies that are actively engaged in the metaverse economy. The engagement in the metaverse economy can take multiple forms including the provision of the technology building blocks for the metaverse, of software and hardware to access the metaverse, and of products, services, and experiences within the metaverse. This provides an indication of the opportunity offered to multiple players in the ecosystem to leverage the metaverse theme.

For a security to be eligible for inclusion in the index, it must be classified by CB Insights as a Metaverse company. The index selection process is further refined with each security assigned a Metaverse Intensity Score which is calculated by CB Insights' proprietary scoring mechanism. The score is influenced by several factors, including but not limited to metaverse-related investments, acquisitions, business relationships and patents, and metaverse keyword mentions in earnings calls. CB Insights has further classified each security into Purity Tiers and Subsectors suggesting that there is a degree of specialization within the metaverse economy. With regards to subsectors, CB Insights has classified companies into three categories: Economy, Infrastructure, and Interface. Economy refers to the content that users create and consume in the metaverse (for e.g., virtual stores, decentralized commerce, virtual real estate); Infrastructure includes technology solutions with broad applications (for e.g., 3D Body Scanning, AR Developer Platforms, VR Developer Platforms); and Interface includes the software and hardware for users to access the metaverse (for e.g., AR & Smart Glasses, Displays).

With regards to the degree of purity of a metaverse security considered for index inclusion, securities must be classified into one of three Metaverse Purity Tiers including Pure-Play, Hybrid, Adopter. These additional layers of classification help in grouping companies based on the specialty of the product. Pure-Play companies primarily offer products and services that are metaverse-related. Hybrid companies, on the other hand, are not engaged in the metaverse as their primary line of business; they generally develop secondary metaverse offerings, serve the metaverse ecosystem with existing products and services, and/or make investments in other metaverse companies. Adopter companies generally repackage metaverse products and services developed by others.

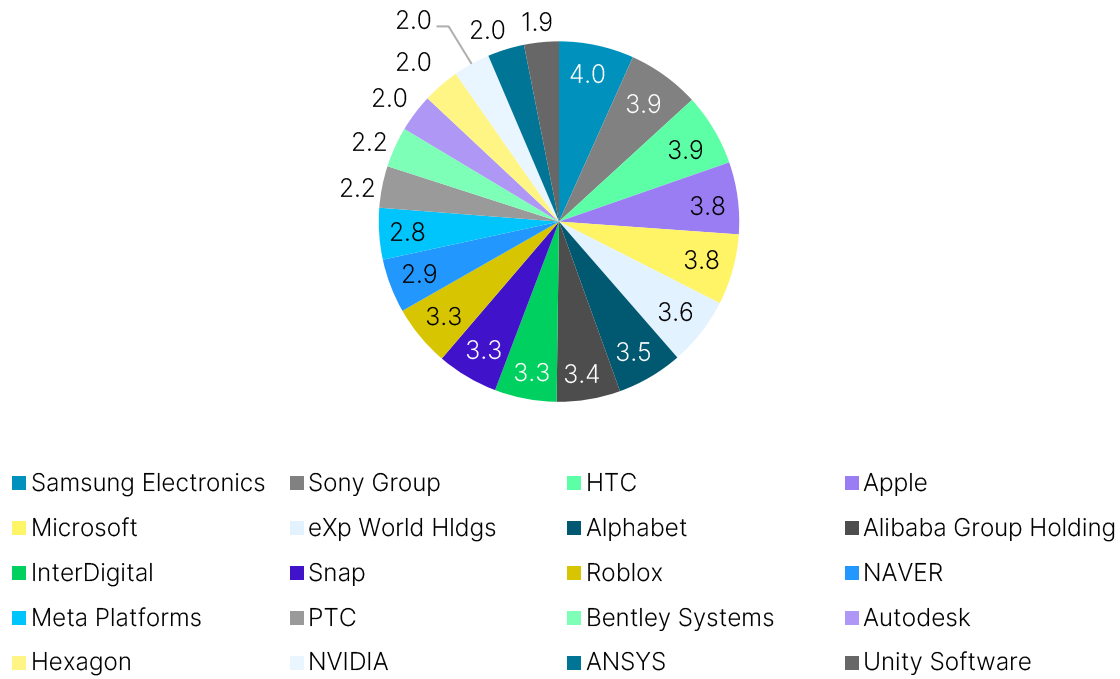
With regards to the weighting scheme, the index is a modified equal-weighted index. Securities are equally weighted within each Metaverse Purity Tier. Pure-Play securities receive three times the weight of an Adopter security. Hybrid securities receive one and a half times the weight of an Adopter security. Pure-Play securities receive twice the weight of a Hybrid security.

The index is rebalanced quarterly in March, June, September, and December, and reconstituted semi-annually in June and December. All securities must have a minimum market capitalization of at least \$1 billion (USD) and an average daily traded value of at least \$500 thousand (USD). Additionally, at least 20% of a security's total shares outstanding must be publicly available for trading. These screens for market-cap ensure that companies which are small and less liquid are filtered out.

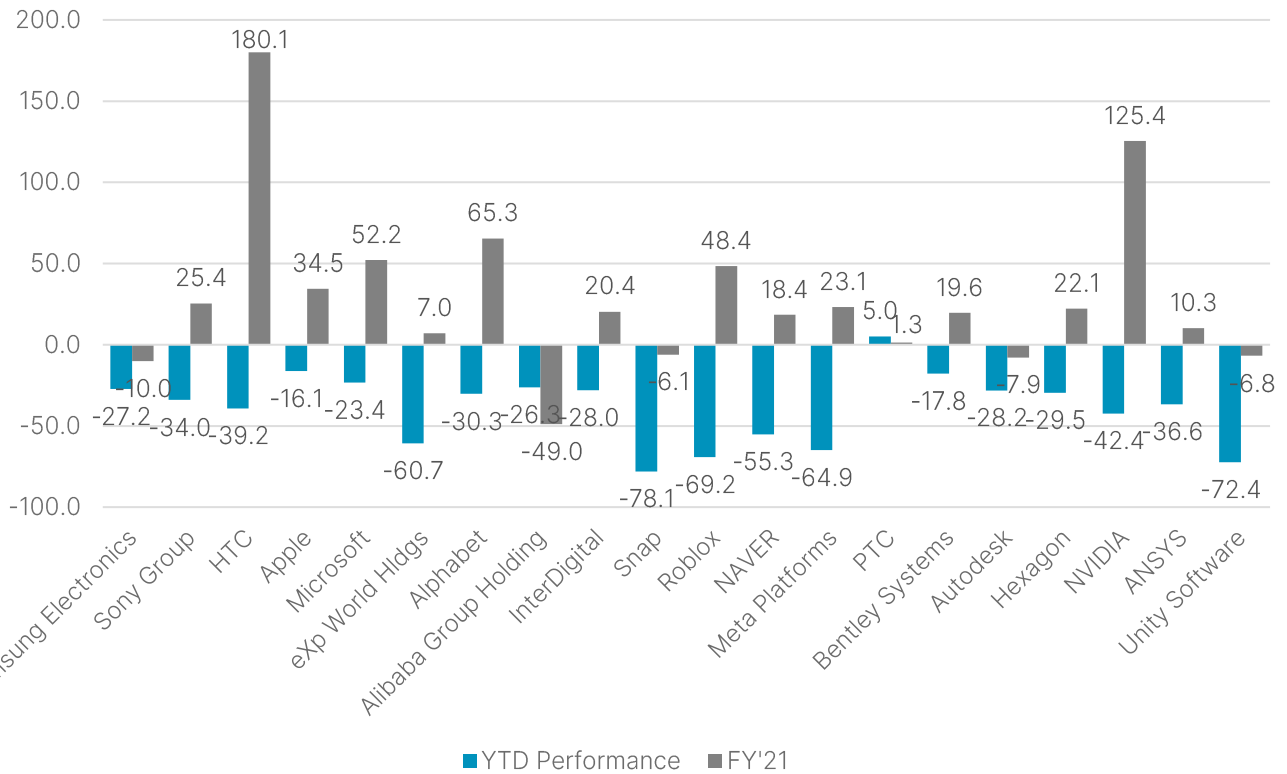
Index Composition and Performance

Of the 50 constituents currently in the index, the top 20 names comprise 59.5% of the index weight, with Samsung, Sony Group, HTC, Apple and Microsoft comprising the top 5 names. At the outset, we note that there is a healthy representation of leading incumbents of technology in the top 20 such as the likes of Microsoft, Alphabet, Apple, Meta Platforms and Qualcomm. These companies are in the forefront of revolutions in the technology industry including the shift to digital and cloud and are making significant bets in the metaverse. Their entry is likely to help the theme gain traction as they draw on internal resources that have been built over many years. While the theme is in the early stages of adoption and has been touted as a risky bet, the significant investments in brand and intellectual property value from some of the largest companies backing the metaverse should support the long-term potential of the theme.

Index Weights of Top 20 Companies (%), as of 11/30/2022



Top 20 Index Weights: YTD'22 vs. FY'21 Returns, %



As of November 30, 2022

Not all players in the top 20 have assumed the same level of risk in the metaverse. Players such as Meta Platforms, for instance, have made relatively high stakes investments in the metaverse and might underperform in volatile markets; its stock is down 64.9% year-to-date, the fourth-worst performer among the top 20. Apple, while not an early adopter of the metaverse theme, has indicated that it's developing an AR/VR headset called Reality Pro or Reality One that could hit the market in 2023. It has comparatively lower stakes, and is down only 16.1% year-to-date. This diversification in terms of assumed risk helps explain the wide divergence in performance this year among the top 20 names. It also reduces the likelihood of uniformly sharp draw-downs in the index.

Meta Platforms' ambitions for the metaverse have raised concerns among investors about the near-term validity of the theme, particularly the economic rationale of expanding into the metaverse at a time when the economy is slowing. The initial losses associated with Reality Labs have inspired more fear than an average investor would have considered optimal, particularly for a theme that is touted to be game-changing and the next phase of the internet. While Meta Platforms leads the list of companies with ambitious targets for the metaverse and retains the highest degree of purity in the index, its early results in the metaverse should not serve as a read-through for the rest of the index or an indication about its long-term growth prospects. Other components of the index have lower degrees of purity in the metaverse theme, which is likely to serve as a cushion during periods when the theme is being questioned, especially amid broader market uncertainty. If the index had been constructed solely of pure-play companies, there could be a greater chance of underperformance in uncertain markets. By subscribing to a balanced approach with varying degrees of purity in the index, there is potential for preserving upside when the theme is gaining traction, while limiting downside during periods of volatility.

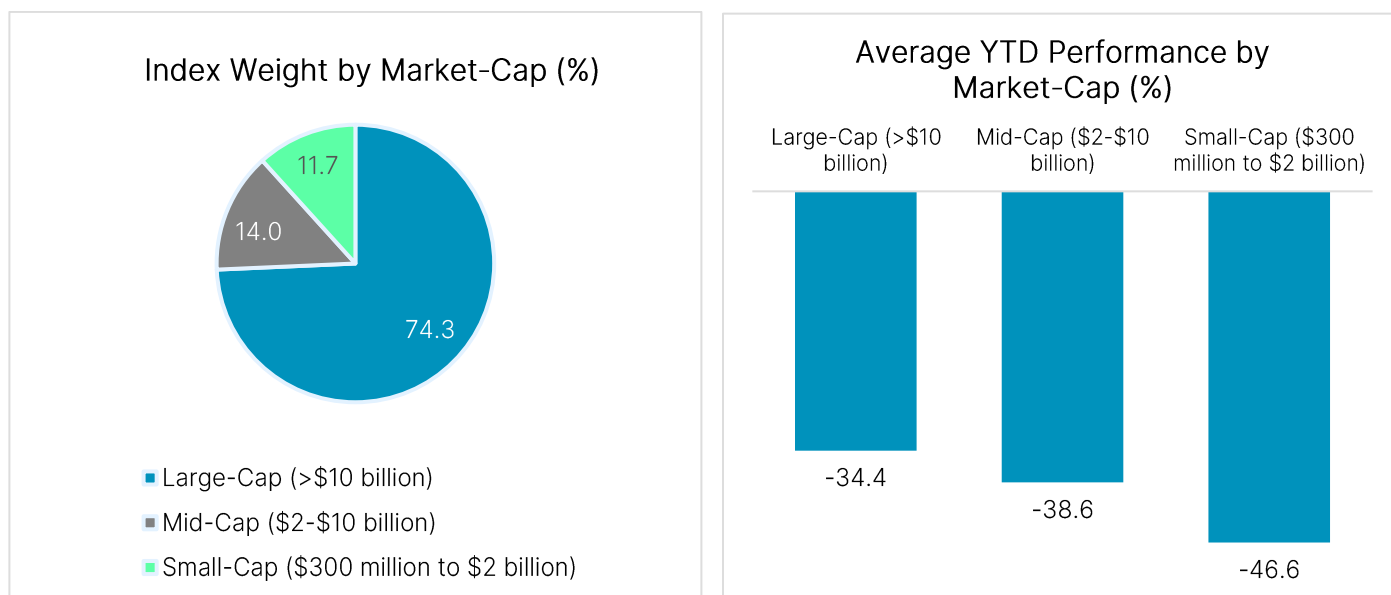
Even within the bucket of companies that are considered pure-play, there is a degree of differentiation in offerings. For example, Sony envisions a social and network space where games, music, movies and anime intersect. Samsung's initial foray into the metaverse was Samsung 837X, a virtual experience that replicated Samsung's flagship office in New York City to generate an inspirational feeling of being on the streets of NYC.

To illustrate some of the significant moves made by players in the top 20 to enter the metaverse theme, we highlight the likes of Microsoft. Microsoft has steadily built the largest breadth and depth of functionality to deliver the metaverse platform and made an announcement earlier this year to acquire Activision Blizzard for \$68.7 billion, a move seen by the broader public as a metaverse play. While it has the potential to fall through with the FTC suing Microsoft to block the acquisition, it provides an indication of the sizable potential of the theme. Microsoft has not, however, realigned its business model to be focused solely on the metaverse and is operating largely as an enterprise software company with several businesses that are cash-cows; is positioning to be a significant player in the metaverse nonetheless, and its stock price is down only 23.4% year-to-date.

The remaining 30 constituents make up 40.5% of the index weight. Among them, Nintendo and Take-Two Interactive operate in gaming, an industry where the use case of metaverse is broadly accepted by the public. Other companies operate in industries as diverse as media and entertainment (for e.g., Warner Music and Walt Disney), internet and related services (for e.g., Baidu) and retail/consumer discretionary (for e.g., Walmart and Nike). The diversification afforded by the rest of the index in terms of end-user industries is likely to provide further cushion to investors during uncertain markets. As an example, Walmart is one of a few index constituents to have a positive return YTD, up 6.5%.

All but one of the index constituents in the top 20 have seen negative returns this year, dragged down by several factors including investor pessimism towards high-growth technology stocks, uncertainty surrounding the experimental nature of bets in the metaverse, and exposure to e-commerce which was impacted by the macroeconomic environment. Layoffs across numerous tech companies – as well as the large sums of money spent by Meta Platforms on Reality Labs – have generated a sense of pessimism over the long-term outlook, perhaps more than warranted, especially considering Meta’s challenges with its core business and growth story generally. Some names like Roblox, eXp World Holdings, and NAVER were dragged down more than the overall index, due to fears of a recession, tough post-pandemic comparisons, misses on the top-line and bottom-line, and regulatory headwinds. In 2022, all but three constituents (Walmart, NEXON, PTC) have seen negative returns YTD, a mirror image of 2021 when all but three (Samsung, Alibaba, Autodesk) reported positive performance.

Index Weight and Performance by Market-Cap

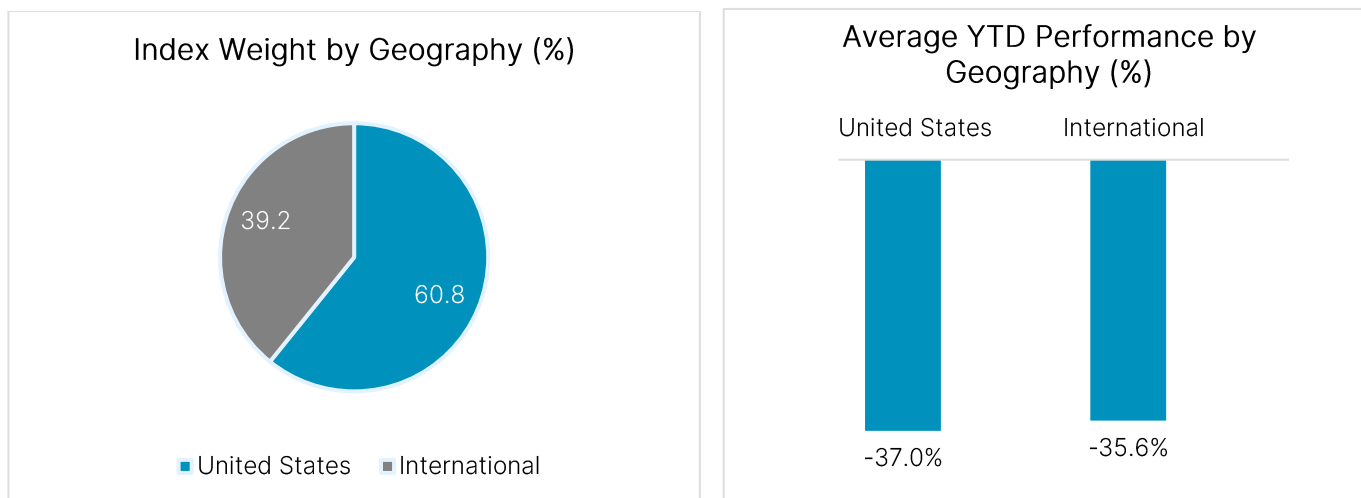


As of November 30, 2022

NCMETV has a large-cap tilt, with close to 74.3% of the index weight contributed by companies with a market cap above \$10 billion. Around 14% of the index weight comes from securities with a market cap from \$2-\$10 billion, and only 11.7% of the index weight comes from small-cap companies.

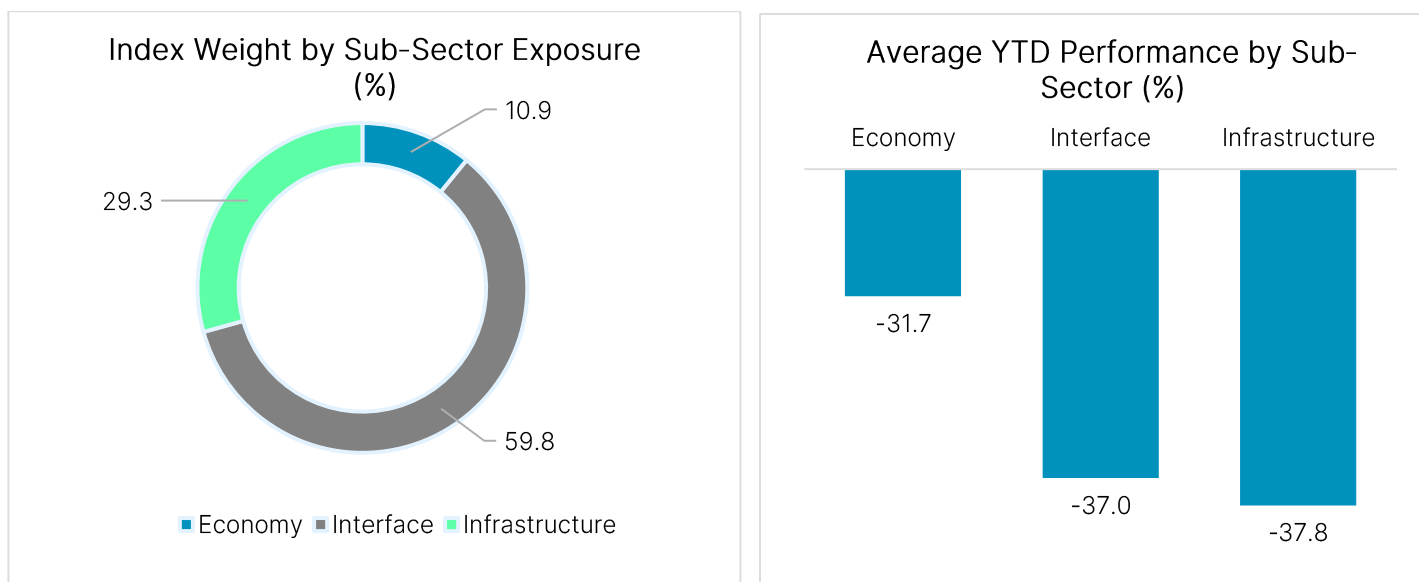
When we look at index performance for the YTD period through November 30, 2022, large-cap has outperformed both mid-cap and small-cap. Large-cap companies were down 34.4% on average, outperforming, on a relative basis, both mid-cap and small-cap, down 38.6% and 46.6% respectively. This sub-group is made of a relatively large number of constituents (count of 36), with a wider dispersion in performance within the sub-group when compared to the other two sub-groups. Many companies in this sub-group were better positioned to weather the challenges of a tough macroeconomic environment due to pricing power, brand-recall, and strong demand from key customers. Small-cap companies, as a group, underperformed, due to the absence of any significant catalysts and exposure to macroeconomic uncertainty.

Index Weight and Performance by Geography



About 61% of the index weight is made up of companies based in the United States while about 39% of the index weight comes from international holdings. If we examine the returns in the YTD period, we see that the United States sub-segment has underperformed marginally the international segment. It is not a material underperformance as technology and growth companies have been underperforming globally YTD. Both the segments were dragged down by macroeconomic uncertainty, advertising spending cuts, exposure to China’s worsening economy, and regulatory headwinds.

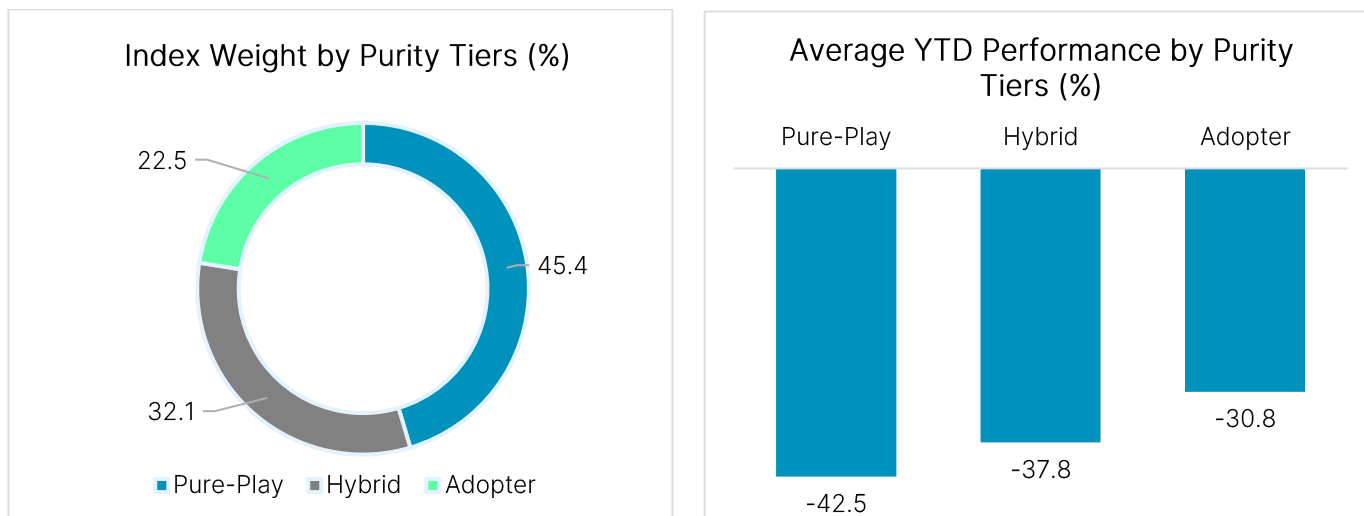
Index Weight and Performance by Sub-Sector Classification



The index is made up of companies that specialize in Metaverse Interface (60%), Infrastructure (29%) and Economy (11%), as per CB Insights’ proprietary classification system.

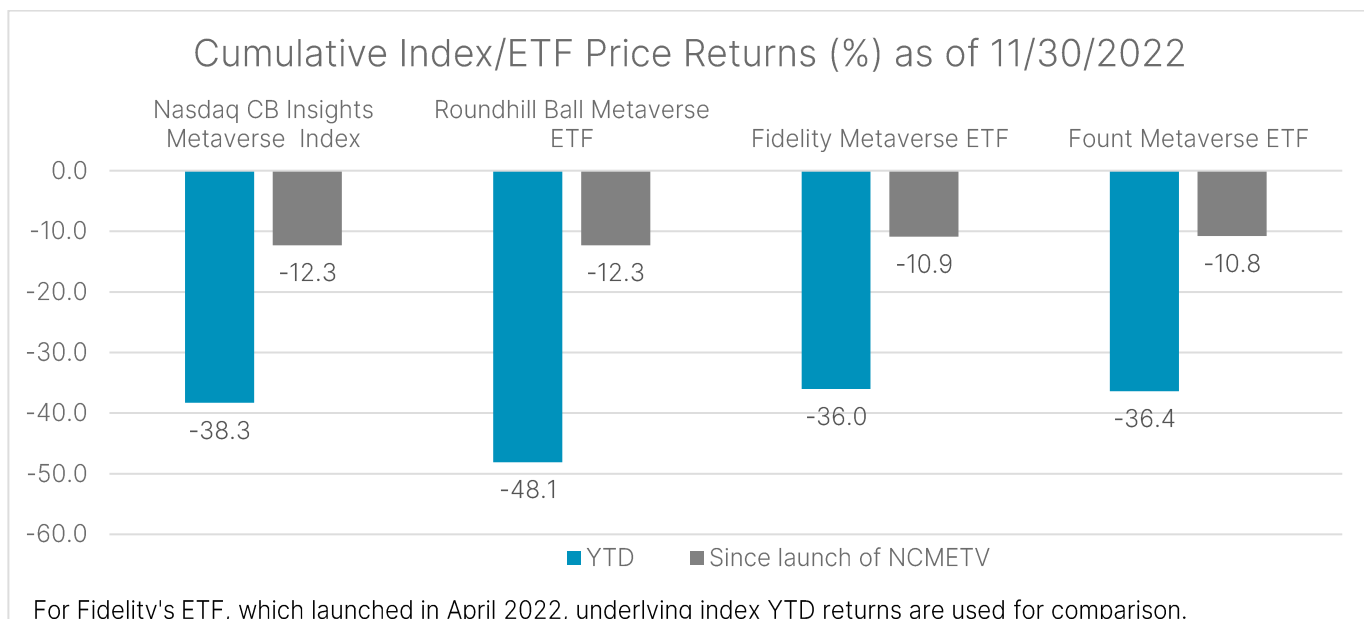
Economy, as a sub-group, has marginally outperformed Interface and Infrastructure by about 5-6 percentage points YTD. As far as the very similar performance between the three sub-groups, we are still in the early stages of the theme. As the technology matures and investors have a more nuanced understanding of the theme, these groups may begin to perform differently.

Index Performance by Purity Tiers



Companies that are considered Pure-Plays have the highest index weight of 45%, followed by those that are Hybrid with an index weight of 32%, followed by the Adopters with an index weight of 23%. Pure-plays have underperformed the other two buckets, suggesting that investors view heightened metaverse exposure as somewhat of a penalty in today’s market environment. Adopters, on the other hand, have outperformed on a relative basis, likely due to a lower degree of alignment with the overall theme. The dispersion in results suggests that the index affords a degree of diversification. Not all companies are likely to be dragged down to the same extent should investor confidence in the theme remain depressed.

Index Performance versus Competitors



The Nasdaq CB Insights Metaverse Index (NCMETV) has performed similarly to two out of three competitor products YTD, down 38.3%, and two out of three products since its launch on July 29, 2022. It materially outperformed the Roundhill Ball Metaverse ETF (METV), the first metaverse ETF launched in June 2021, which is down 48.1% YTD. METV has the lion’s share of the metaverse ETF market (about 94% of total assets). Given significant concerns surrounding the near-term profitability of metaverse and metaverse-

related investments, ETFs such as METV have seen large drawdowns this year. For the period since launch, NCMETV was down 12.3%, marginally outperforming the Fidelity Metaverse ETF (FMET), down 10.9% and Fount Metaverse ETF (MTVR), down 10.8%. These two ETFs rank below METV in terms of total assets. As a point of comparison, the Nasdaq-100 is down 26.3% YTD and the S&P 500 Information Technology Index is down 22.4% YTD (as of November 30, 2022).

Conclusion

Companies that make up the NCMETV Index are amid a multitrillion dollar technological transformation that is expected to unfold over the coming decades. The potential economic value of the metaverse is estimated to be \$1.5 trillion by 2030, according to CB Insights' market sizing tool. While there are some concerns about the nature and potential of the metaverse and its broader societal impact, there is early indication from tech executives that metaverse, as a theme, has the potential to be the next version of the internet. As to whether metaverse will follow the same glide path as other recent advances in technology such as cloud and artificial intelligence, much depends upon how rapidly the technology stack of the metaverse advances in terms of interoperability. Investor enthusiasm is very strong as evinced by the amount of money poured in by corporations, venture capital firms and private equity firms in the first five months of 2022 (about \$120 billion), more than double the \$57 billion invested in all 2021¹.

The NCMETV Index is down 38% YTD due to several factors ranging from broader macroeconomic challenges, to concerns about the near-term profitability of the metaverse to company-specific headwinds. While there is some uncertainty regarding the near-term outlook due to a slowing economy, rising rates, inflation pressures, and geopolitical tensions, the long-term growth story of the metaverse appears to be intact. The announcement of several key partnerships between leading players in the technology ecosystem, the proliferation of new use cases and the increase in budgets towards metaverse projects all point to a healthy growth story.

Sources: CB Insights, Nasdaq Global Indexes, FactSet, McKinsey Global Institute, Deloitte Insights

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¹ <https://www.mckinsey.com/capabilities/growth-marketing-and-sales/our-insights/value-creation-in-the-metaverse>