



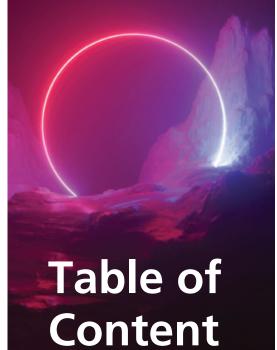
Whitepaper

METAVERSE

Next Level Customer Experience

Author: Vinit Pandey

Metaverse, the new buzzword is a talking point from boardrooms to meeting rooms, from training rooms to water cooler discussions, and from strategy discussions to multi-billion growth opportunities. Is this just a FOMO, or is it ineluctable and is going to drive business through a unified immersive experience?



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Abstract

Caroline is a data scientist from France, who starts her day with exercise. She puts on her VR headset and enters in virtual training space where her virtual trainer is already present. Accelerometers are giving live feed of her body movements and the trainer is fast to correct her for any mistakes. After an intense fitness regime, quick bath, and breakfast she heads to her home office.

Caroline puts on her mixed reality headset and enters the virtual shared office space where her new colleague avatar was waiting. After a formal intro, they headed to the pre-booked virtual board room for project discussion. Her colleague was fond of French, so Caroline spoke a few sentences in French and in-app translator made it easily understandable.

After a hectic day at the office, Caroline had to catch up with her family, unwinding over a cup of coffee. She put on her AR glasses to join her family in virtual dining hall. They talked about day and life. Caroline was so indulged in conversation that she almost forgot to buy a dress for her workshop the next day.

They all took leave and Caroline entered a virtual clothing retailer shop to pick up a new dress. She selected few dresses and tried them on her 3D holographic pictures to finally select one. On the

virtual counter, she paid with digital currency to the virtual assistant. Dress was soon dispatched to her home. While having her dinner she watched a 3D movie in virtual theatre. Soon she crashed on bed and dozed off.

Doesn't it look like Matrix movie set or the world in 2050? It's not, **it's Metaverse**

25% of people will spend at least one hour per day in the Metaverse by 2026

– Gartner¹

By 2030, total Metaverse users will number around five billion

- Citi²





What is Metaverse?

The word Metaverse has its origin in a science fiction novel, Snow Crash written by American writer Neal Stephenson, and published in 1992. Its portmanteau of "Meta" which means beyond and "verse" from the universe. He wrote about a virtual reality world "Metaverse", where people lived in an online world using digital avatars of themselves to escape dystopian reality. He pictured a world where the federal government has collapsed, and private companies are controlling the world.

Now three decades later, Metaverse is reality minus the dystopia.

Metaverse is the "next-generation internet" that converges our physical lives into digital platforms seamlessly. It provides a decentralized, immersive 3D virtual environment accessible through VR headsets, AR glasses, and game consoles and is now adapting to PCs and smartphones. The metaverse is accessible from anywhere, breaking down boundaries and democratizing access to key goods, services, and experiences.

Metaverse has an independent virtual economy, enabled by digital currencies and nonfungible tokens (NFTs). It is a collective virtual space, created by the convergence of virtually enhanced physical and digital reality

– Gartner³

The metaverse is the next evolution of social connection

-Meta (formerly Facebook)⁴



There is no single virtual world, but many worlds providing an immersive digital experience.



Metaverse evolution

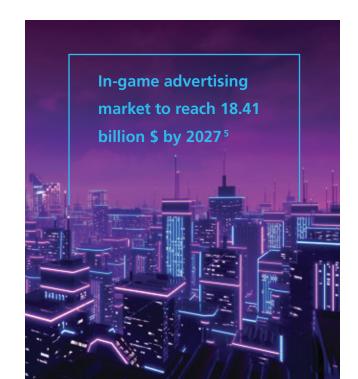
Metaverse can be seen as a natural evolution to the internet. It's just how the barter system got replaced by banks, then the ATM came for anytime cash distribution and now we see cryptocurrencies getting common every day.

A San Francisco firm, Linden Lab developed a multimedia platform, Second Life in 2003, where people could create their avatar and live a second life in the online world. These users or residents could socialize with other residents, buy and sell the virtual property to each other, and participate in activities. The experience of Metaverse was amazing, which made it an excellent use case for the gaming industry. Gaming environments like Roblox (2004) and Fortnite (2017) quickly joined the bandwagon and boosted their business to have hundreds of millions of users today.

As the market is picking cryptocurrency, money also found its way in the metaverse. There are many popular games in the market today as Call of Duty and Game of War, where money can buy game accessories. There has been a surge in the interest in Non-Fungible Tokens (NFTs) and it has become a key driving force in Metaverse. NFTs are built on blockchain technology that gives rightful ownership to the NFT holders. So, it gives an opportunity to own real estate, cars, accessories,

paintings, etc in Metaverse. Many brands such as Nike are entering the merchandise space for avatars. Decentraland is a virtual world where users can buy and sell land based on the Ethereum blockchain. OpenSea is a virtual marketplace where virtual properties can be bought and sold. It's like Amazon or eBay of NFTs.

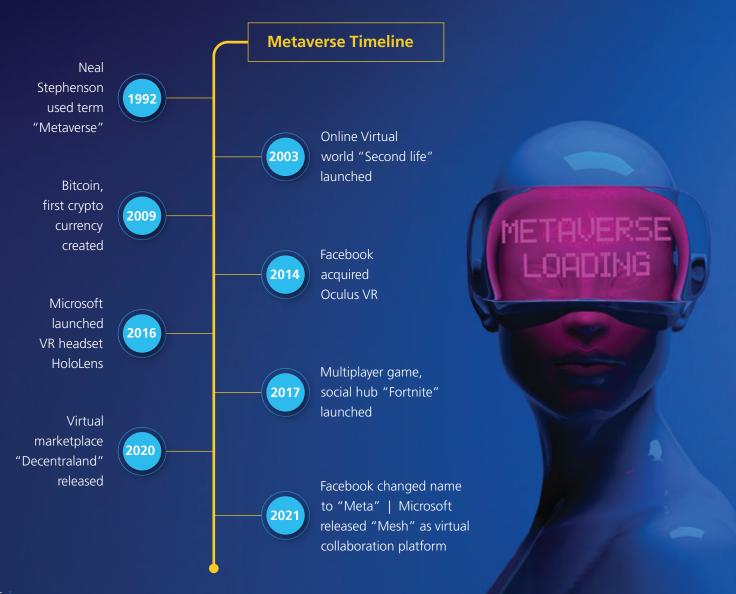
Post-pandemic scenarios like work from home and hybrid work have sparked a need for a more organized life, overall well-being, and social connection. Corporates like Facebook (now Meta) and Microsoft have answered the need through metaverse as experience is the key feature. Google Trends also suggests that Metaverse getting more popular post-Covid.





Metaverse search trends on Google







Why Metaverse is a big deal?

Metaverse has been a recent tech buzz. Everyone including business leaders is talking about it. Is there a genuine use case around Metaverse or is it just a hype? We believe that Metaverse will keep growing and trends and studies suggest it too. Here are the major reasons to suggest that Metaverse is here to stay:



It's all about the experience

Experience has found a prioritized space in all the trends coming from the likes of research and consulting firms like Gartner and Forrester. Metaverse has by default become a prime pick in this space as it's all about a unified and immersive experience. Big corporate titans such as Microsoft, Meta, Google, and Nvidia have explored and are strategically adopting Metaverse as one of their key offerings.

Land prices
doubling from an
average of \$6,000
per parcel in
mid-2021 to
\$12,000 per parcel
by year-end⁶



It's a natural evolution

Metaverse can be seen as a natural evolution of the internet as Mark Zuckerberg said, "I believe Metaverse is the next chapter for the internet". We had static websites on the internet in the 2000s which evolved into more dynamic and crisper web pages. Then social networking sites like Orkut and Facebook came in, which allowed people to connect and share. YouTube provided a video platform where hundreds of millions of videos are hosted. Post pandemic, people feel the need to be more connected for social well-being and to be productive in the workplace. Metaverse's immersive 3D experience is a natural evolution from 2D videos and videoconferencing, and at the same time meets the present requirements.





Traction in technology

Anything gets more traction as money gets involved and people get the opportunity to earn. With blockchain and cryptocurrencies getting common, people can use them to buy NFTs on Metaverse, which is cool yet rewarding. Trends suggest that NFTs are gaining a multi-fold value increase which justifies more individuals and companies buying land in Metaverse and associated price appreciation.



Accessibility of AR/VR devices, Web 3.0, Crypto, and next-gen internet

Metaverse has its set of requirements, and accessibility of technology is attributed to its growing adoptability. AR/VR devices are getting cheaper and with 5G coming in most parts of the world, the internet speed is sorted too. Cryptocurrencies and blockchain are getting popular, paving way for users to be the rightful owner of NFTs.



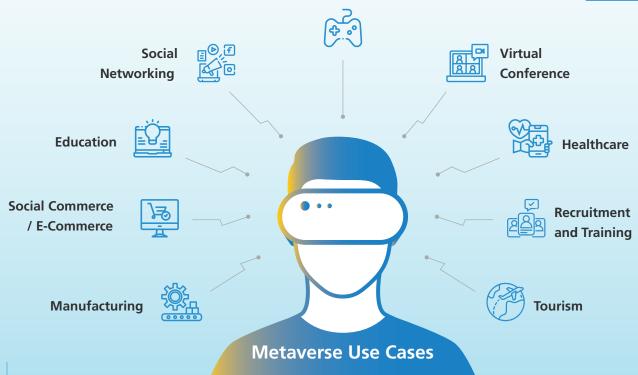


Metaverse use cases and "Next Level" User Experience

Metaverse provides a 3D immersive experience. It adds a new multidimensional visual layer, allowing corporates to reimagine the customer experience in a world of Augmented Reality (AR), Virtual Reality (VR), mixed reality, and physically accurate digital twins. Metaverse has given the onset of a virtual world with millions of users and increasing. It offers an opportunity for brands to rethink their strategies and adapt to changing conventions. It also provides prospects to connect to users present in any part of the world, with a first-hand experience of their products and scale massively. Metaverse has a plethora of use cases. Few of them are emerging while others have already seen a lot of traction.

You can actually feel like you're in the same place with someone sharing content or you can teleport from different mixed reality devices

Alex Kipman Microsoft Technical
 Fellow for Mesh⁹



Gaming





Gaming

Gaming is possibly one of the primitive and major adopters of Metaverse. It entices players and provides an opportunity for them to play together in a 3D virtual platform from across the globe. Some gaming platforms even provide flexibility for gamers to create their own environment, content, and rules.

Gaming in Metaverse lifts the player's experience to the next level with a blend of avatars, virtual reality, augmented reality, live streaming, Crypto, blockchain, and social media. Powered by VR/AR devices and fast internet, games in Metaverse provide a real 360-degree experience. Haptic gloves and jackets add a physical touch to it.

Many games such as Axie Infinity are based on crypto and blockchain, making them more exciting as a player can buy, sell, and trade game assets in the form of NFTs. Now, platforms are trying to make a cohesive ecosystem where digital assets from one company can be used in another.

Due to the very large market, many tech giants are entering the gaming metaverse. Microsoft has recently acquired Activision Blizzard, maker of Warcraft and Call of Duty in an all-cash transaction of a whopping \$68.7 billion. This biggest ever game deal will make Microsoft the third-largest gaming revenue company – only after Sony and Tencent.

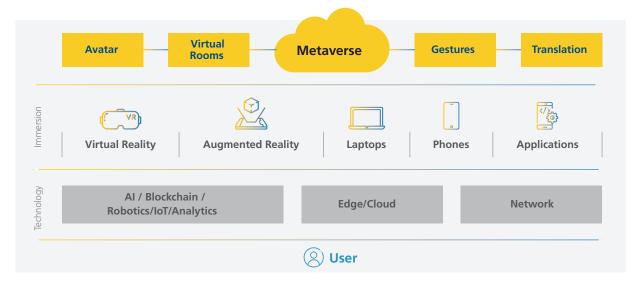


Virtual Conference

Metaverse can elevate the video conference experience for remote and hybrid users with engaging, real-time audio and video interaction in 3D immersive meetings. Metaverse provides a real-life-like virtual environment, where employees can connect to each other in form of avatars. Many biggest tech brands are working to launch technology and gadgets for the adoption of Metaverse.



Microsoft has launched a product for Teams, Microsoft Mesh, which provides users to connect with 3D avatars along with engaging eye contact, facial expressions, and gestures.



Zoom, another video-conferencing platform, has also taken first steps to enter Metaverse, by adding a new feature that lets users replace their appearance in virtual meetings with animated avatars. With this feature, a user can replace their face with an animated character, which can mimic the head movements and facial features of the user. These avatars could be expanded to include other characters at a later stage.







Recruitment and training

As most of the companies are operating in remote and hybrid modes, it's not possible to do an in-person recruitment drive. Recruiters have mostly leaned to video and telephonic calls to hire candidates. However, as millennials are swiftly adopting Metaverse, it's important for recruiters to shift to Metaverse to adapt and engage with young talent. Metaverse also provides an opportunity to train new hires in the most engaging way. Companies have developed a program on Metaverse where new employees experience a company facility as their workplace, labs, test centers, and recreation facilities and bond with each other easily.

Recently, the Shanghai stock exchange conducted a recruitment drive, where applicants can enter with their digital avatar in a black suit. Samsung Electronics has also conducted a recruitment fair on the metaverse platform Gather Town, to reach out to potential employees in the younger millennial and Generation Z demographic. Participants will log onto the platform with their own avatars and talk to the avatars of Samsung Electronics HR managers and staff.

Companies such as Hyundai Motors, SK Telecom, LG Innotek, and Nexon have been holding similar sessions on metaverse platforms like Gather Town, ifland, and Zepeto. Six universities in Seoul including Seoul National University and Yonsei University also began an online job fair through Gather Town.

Companies like Accenture and PwC have created virtual parks and virtual campuses on Metaverse to onboard new hires. Its more productive for people to learn, collaborate and inculcate the company culture.

We've seen great success in using this platform to connect with high school leavers and graduates in particular and, to date, have welcomed over 17,000 students to PwC's Virtual Park

Jeremy Dalton,
 head of extended
 reality (XR) for
 PwC UK¹⁰

150,000 new hires are working from the metaverse on their first day

Accenture 11





Tourism

Pandemic has a major impact on the travel industry and people are unable to travel to their chosen destination due to restrictions. Tourism is also costly and not everyone has the financial appetite to bear the cost. Metaverse allows people to visit places, which are inaccessible for them to visit personally. With AR, VR, and advanced virtual graphics, Metaverse provides an in-person experience to users. Many governments and private firms have jumped in or are planning to enter Metaverse space.

Disney has registered a "virtual-world simulator" patent to project 3D images and virtual effects onto physical spaces using headset-free augmented reality.

Several communities and archaeological sites in Yucatán have launched projects to bring their attractions into the world of virtual reality and create virtual tours. It will allow users to even see the areas which are off-limits to visitors as well as impossible perspectives such as drone views.

The Ministry of Culture, Sports and Tourism, and the Korea Tourism Organization launched a new campaign 'Come Play with Korea, K-VIBE FESTA' using the metaverse platform to provide a new traveling experience to Korea. It provides a chance to experience Korea indirectly with a personalized itinerary. The Gyeongju city is created in the Metaverse, offering visitors a chance to experience the cultural heritage sites of the Silla Dynasty and other popular tourist hotspots.

Major sporting events and clubs are starting to tap into the Metaverse to attract fans. Australian Open is the first Grand Slam to enter the metaverse with the first minting of the "AO Art Ball NFT" linked to live match data, giving people globally the opportunity to own a piece of the AO. It is virtual hosting in Decentraland, allows tennis fans across the globe to explore the Grand Slam.

"The Australian Open prides itself on being one of the most innovative sports and entertainment events in the world, and we are delighted that through our expansion into the Metaverse and Decentraland, more fans can engage with our sport than ever before,"

- Chief Commercial Officer Cedric Cornelis, Tennis Australia 12





Manufacturing

Metaverse 3D interactive experience makes itself a prospect to explore in the manufacturing sector. It can be used for a digital twin technology, which is a virtual representation of physical assets as machines, plants, supply chain and components. It supports simulation of performance, maintenance and layout of ecosystem, component assessment, asset management and creating test environment. By utilizing simulations, manufacturers could significantly cut down on project costs, time, and wasted resources. Due to a futuristic approach and the importance of digital twins, many manufacturing companies have already joined the Metaverse bandwagon. Hyundai has partnered with Unity, a maker of platforms for real-time 3D content, to jointly design and build a new metaverse roadmap and platform for a Metaverse-based digital-twin factory to optimize plant operation and allow virtual problem-solving.

AB InBev has created a comprehensive digital model of its breweries and supply chain. The simulations on top of digital twin provide insights and optimizations from massively complex environments. Mixed reality is used over their digital twin for remote assistance, which fosters effective knowledge sharing across geographies.

Microsoft has developed a complete Metaverse technology stack on Azure. Each of the layers in the stack can enable the Metaverse application.

Hyundai's vision for the future, including the digital twin of factory operations, represents a significant technological step forward in manufacturing with unlimited potential in its efficiency."

- John Riccitiello, Chief Executive Officer (CEO), Unity 14

6.7 million people from 224 countries have visited Nike's metaverse store

- President and CEO, John Donahoe, Nike Inc.¹⁵





Social Commerce/E-Commerce

Metaverse uses AR, VR, mixed reality, and virtual space to add a new multidimensional layer that redefines and recreates immersive customer experiences. From choosing a virtual product, without leaving the comfort of home, provides an option for the customer to try out the products before buying with cryptocurrencies. This brings customer delight to a whole new level where e-commerce intersects with social media.

E-commerce and retail giants have started investing in Metaverse looking for options to create immersive shopping experiences. Nike has acquired RTFKT which they call "a leading brand that leverages cutting edge innovation to deliver next-generation collectibles that merge culture and gaming" They have developed their virtual store in the metaverse, Nikeland which allows avatars to try virtual Nike-branded sneakers and apparel. They have also filled many trademarks for making itself meta-ready. Furniture major, Ikea has created virtual showroom to offer immersive 3D experience for customers. With new way of exploration and 360-degree visualization, customers can try different dimensions, products, and colour palate, to find a perfect fit for themselves.

Other brands like Adidas, Gucci, and Burberry are also embracing Metaverse and using it as a platform to sell NFTs in the form of virtual attire and accessory. Metaverse popularity is even taking brands to show up in virtual space through advertising and billboards.







Healthcare

In-person interaction between patients and healthcare providers have drastically reduced post pandemic. Metaverse's immersive 3D experience paves way for telemedicine facilitating virtual check-ups in virtual clinic or any other place. It also dodges the geographical limitation, and patients can be checked and treated by specialist from any part of the world.

Healthcare metaverse can also support healthcare specialist and professionals across the countries to collaborate and share information, to make the journey of patients and their families easier. It provides a platform to host conferences, workshops, knowledge sharing and training.

gameChange is a VR system-based psychological therapy for people with psychosis. It provides simulation of everyday situation and public places for patients to practice and evolve around them.

DeHealth has announced creation of a decentralized Metaverse, where doctors and patients can interact with each other in full 3D format and earn virtual assets by selling their anonymized medical data.

Veyond Metaverse also offers Healthcare Metaverse for engagement and collaboration to augment and improve medical education, surgical training, patient treatment by enhancing medical procedures, diagnosis, treatment worldwide.

28 percent people in metros and 24 percent in Tier-1 cities said they may prefer online consultations

BCG survey¹⁶

Telehealth use has increased 38X from the pre-COVID-19 baseline

– Mckinsey¹⁷



Asian Society for Cardiovascular and Thoracic Surgery (ASCVTS) provided lung cancer surgery training through a metaverse platform at an online conference to over 200 Asian thoracic surgeons.

Seoul National University Bundang Hospital (SNUBH) is also providing training to medical staff in a smart operating room in the Metaverse.

> "We have taken a leap and launched UnfoldU 2.0, which Metaverse and blockchain will power. Our market is now limitless, and content delivery will improve the crippled education system"

- Harish Bajaj, CEO and founder of UnfoldU Group 18







Education

"What I hear, I forget. What I see, I remember. What I do, I understand." Chinese philosopher Confucius makes a strong point that when it comes to learning, hearing is not as good as seeing, seeing is not as good as experience, and performing action. The fundamental feature of Metaverse to provide 3D immersive experience makes it ideal for being adopted in the education industry. It provides "live" platform for students and teacher to connect and learn better due to visual orientation. The metaverse can transform the learning process and create a truly effective learning environment. Students can learn about plants from garden, astronomy from space and spaceship, animals from forest and culture by being in the country. They can simulate dangerous tests from safe physical location. Metaverse can tele-transport students to different place and times. It provides opportunity to learn about how Taj Mahal was built by standing next to it when it was built.



It also allows cross-boundary connections to eliminate location as well as language barriers, allowing access of best education to students living in remote areas. Microsoft Mesh has an option to connect and interact in a virtual classroom in form of an avatar. It supports many languages in form of subtitles and translation. Many companies and players have already entered the education space in Metaverse. Sophia Technologies is planning to create first educational city inside Somnium Space. Education authorities in Seoul are currently operating Metaverse-based science classes for 2,100 students to explore a virtual exhibition hall called "Gather Town" with their own avatars.





Social Networking

In October of 2021, Mark Zuckerberg announced that social media giant Facebook would be rebranded to Meta and created major buzz for Metaverse. According to company, 3D spaces in the metaverse is the way forward to socialize, learn, collaborate, and play.



Post-pandemic era has disconnected people and social networking plays a pivotal role to connect them. People are connecting via phone calls, video calls and social media. Metaverse immersive experience is a boon for social connection, giving opportunity for people to connect in 3-D at any place. Virtual reality and augmented reality in Metaverse allow family to virtually connect in their drawing room, friends to connect in virtual coffee shop and make new friends in virtual spaces. It elevated user experience to next level.

71% of social media users support ads and brand partnerships in the Metaverse

- Izea Research¹⁹

Over 10,000
worlds have
already been
created in
Horizon Worlds

- Oculus.com²⁰



Companies and people have started hosting virtual events, live concerts, hangouts, and promotion events in Metaverse. Content creators are using Metaverse for live streaming on virtual stage and interact with people.

Rapper Travis Scott performed a concert inside battle royale game Fortnite. Samsung created virtual store, Samsung 837X on Decentraland featuring NFT prizes, product drops, events, and live performances for users.

Social Titan, Meta had changed its name and making billions of investments to develop its offering in Metaverse. In the quest, Meta acquired Oculus to accelerate growth and social experience. Now they are trying to improve the experience as well as reduce the price of device to make it more affordable. Meta also developed free virtual reality platform, Horizon Worlds (formerly Facebook Horizon) that allows people to build and explore virtual worlds.





Challenges in Metaverse

Metaverse looks very promising, and all top analyst report suggests so. Its immersive experience has so many use cases as discussed in this paper. However, there are still some challenges which need to be addressed to mitigate the risks posed by Metaverse technologies. The top challenges are as under:



Safety and privacy

Safety and privacy are critical challenges on Metaverse. It's not hard to imitate anyone's avatar and fake voice and expression. Any misconduct posts a threat to reputation. Children are the most vulnerable group and can be exposed to sexual graphics content, cyber harassment, bullying or racist slur. There has been many reported incidents of virtual groping, abuse, harassment, and assault. It's important to have rules and regulation for accurate identification and privacy rights by stopping multiple identities and credential verification like KYC. Metaverse applications should also have safety features to protect users from cyberbullying and online harassment.

There's going to be a lot of innovation and there will be a lot of struggling to figure out what has to be done

- Charlie Bell,
Security chief
Microsoft21
(In reference to
security concern in
Metaverse)



Financial/economy safeguards

Metaverse has a financial angle in form of NFTs, cryptocurrencies, and blockchain. There is a lack of clarity and rules related to NFT rights and licensing. Regulation should be clearly defined for transfer rights. For example, if a virtual painting is sold, does the buyer has only personal or commercial rights also? Can a buyer sell a part of the virtual asset while retaining another portion? Since Metaverse is globally connected, there should be regulatory guidelines on the local jurisdiction, commercial laws, and payment.





Legal regulation

Metaverse is a collection of many technologies and virtual worlds spread across the globe and is decentral in nature. There is a need of legal regulation to ensure it covers the entire Metaverse space across the platform and physical boundary. Many countries are already making progress to create and define regulations. Countries like the Philippines and Indonesia have advanced legal and regulatory frameworks for virtual asset service providers. Thailand also has advanced laws on smart contracts and blockchain, but much more is needed.



Perception of the physical world

Metaverse provides immersive experiences for users to connect virtually, resulting in them spending more time in a virtual world than real. However, touch and feel are still the most important aspects of human life. Metaverse cannot replace a real feeling of walking with a child enjoying ice-cream, preparing food for the family, showing empathy or encouragement through a touch - all other physical characteristic of life. Metaverse can act as bridge between boundaries but can't be "second life".

Supervising how users speak or behave on a large scale is practically impossible

- Andrew Bosworth, VP -VR Facebook²²



Quick Takeaway

Why is Metaverse important for customer experience?

Metaverse provides 3D immersive experiences. It adds a new, multidimensional layer allowing "Next level" customer experience mixing AR, VR, mixed reality, and physically accurate digital twins.

Is Metaverse mature?

Metaverse is still in the emerging phase. According to Gartner, it will attain maturity by 2030.

https://www.gartner.com/en/articles/metaverse-evolution-will-be-phased-here-s-what-it-means-for-tech-product-strategy

What will people do on Metaverse?

There are many use cases for Metaverse as gaming, social networking, education, e-commerce, video conferencing, and others as discussed in this paper. People would utilize Metaverse for these areas with a 3D experience.

How big Metaverse will be?

There are different forecasts from different companies and surveys. Citi predicts Metaverse to be \$8 trillion to \$13 trillion by 2030. In every sense, Metaverse is the next big thing.

Is Metaverse dependent on AR/VR devices?

At present, Metaverse is mostly dependent on ARVR devices.
However, companies are working on technologies to ensure accessibility from phones, browsers, and applications.

What are NFTs?

NFTs are digital assets as land, accessories, collectables found on Metaverse. They can be owned, traded, sold, and transferred by users.
Cryptocurrencies are used to buy these NFTs and associated blockchain ensures digital right of owner.

Are laws and regulations ready in Metaverse?

Metaverse is decentralized, it is a combination of many technologies and many virtual worlds from across the globe.

Countries, companies, and organization are already creating legislation for Metaverse, but still a lot of ground needs to be covered.



Bottom Line

The Metaverse adoption has the potential to improve customer experiences, build brand awareness, improve communications and collaboration, and create new economies.

Companies are already investing significantly to create affordable VR/AR devices, developing applications, and creating browser- ready metaverse content. All this is bound to increase traction and adoption of Metaverse, and reports concur so too.



However, Metaverse is still emerging and is predicted to mature by 2030. It is important for organizations to envisage how it can be utilized for a future business model. Yet, in this early evolution period of the Metaverse, there is risk involved to it. Although there are trends and projections showing Metaverse as the next big thing after the internet, still it's fragmented among early adopters. It's important to take calculated steps in this virtual world and develop a business strategy for continual adoption rather than full-fledged investment straightaway.

Phase-wise evolution should keep the business focused and continue evolving in the digital space as Metaverse attains maturity. Here are some key points for the business Metaverse approach:



Explore
Metaverse
opportunities
for business
and evaluate
use cases.



Identify ecosystem partners and developers to take on board during the Metaverse evolution journey.



Evaluate
technology risks,
privacy, and
security challenges.
Develop a
mitigation strategy.



Develop skill competency.



Develop a few use cases to evaluate the key results and build upon them.



About the Author



Vinit
Pandey
Technical Architect
LTIMindtree

Vinit Pandey is Technical Architect (Digital Workplace Services) at LTIMindtree with more than 15 years of experience in design, consulting, implementation, maintenance, and management of IT infrastructure. He is responsible for driving RFP/RFQ/RFI to build comprehensive experience-driven, Modern Workplace Solution responses and leading large projects in workplace transformation (Cloud, Hybrid, On-premises).

Vinit's core technology strengths are System Center products including MECM, Intune, Security, Azure, Automation and RPA, Digital experience management, Bots, PowerShell, Windows Servers, Windows clients, SCOM, SCVMM, Hyper-V, and Failover Clustering. He also is avid technology blogger and his readings can be found at @vinitpandey.com.



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