AR, VR and Metaverse for Startups

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1   Abstract

Metaverse is now the "flavor" of time for hot tech topics. Facebook changed the name of Meta a few months ago to create a sensation. Microsoft recently joined the Metaverse party with the announcement of Mesh for Microsoft Teams, announcing the integration of Quasimetaverse functionality into popular video collaboration tools. Let's dive deeper in the terms AR, VR and Metaverse in this term paper. All terms are defined with current market apportunities and discussed where we stand currently with these cutting edge technologies. Some top startups are also mentioned with there vision, what they provide to the customers and how they are performing.

2   Keywords

Augmented Reality, Virtual Reality, Metaverse, Startups, Current Market, Projected Growth

3   Introduction

AR refers to *Augmented Reality* which is a hot topic in technology and science field in present. Augmented reality is a technology that is powered by computer vision based logic and algorithms to augment audio, video, graphics and other sensor sensible inputs on real world objects. Basically it helps to make interaction better by virtually rendering objects and information on the real world in an interactive manner. It superimpose the real world view and technically added elements and finally produces coupled form of real world and virtual world to the user.

VR stands for *Virtual Reality*. It is a technology which allows us to create and experience computer generated world which can be simulation of real world or can be totally imaginary. We can create whatever environment we want and experience it in highly interactive fashion. VR could range from crating a small video game to travel through the space, go to the alien spaceship, play with animals in the ocean.

4 AR and VR

4.1 Difference in AR and VR

AR and VR technologies are similar in many aspects of mechanism, technology, concept and quite different yet. These are major differences between AR and VR-

- AR is augmented and backed from real world and need of real world setting is there and in case of VR, everything is virtual and imaginary.

- AR users can control themselves in a better and convenient way namely their position, location, movements etc. while VR users are controlled by the computer or system.

- VR requires dedicated setup to be worked viz VR headset and on the other hand AR can be accessed even with our smartphone.

- AR makes enhancements in terms of visuals and sound in both the virtual and real world and the VR works only for virtual world.

4.2 Market overview

These new emerging technologies are producing endless opportunities for business development and hence producing employment also. According to various financial agencies reports by 2022, the AR and VR market is projected to touch the 209.2 billion USD market. These technologies are currently moving industries through software and hardware development, visuals, audio, graphics, research and more. We can observe from the market that virtual and augmented reality become more entwined in how we process works, how we play, how we learn and think, making the attention this side we can state that this industry will continue growing in long future.

4.3 Present examples of AR and VR

Augmented Reality and Virtual Reality are new technologies which are growing and developing day by day. In the present time, many examples of mobile applications are there which are using these technologies today. Some of them are as following-

- **Rec Room**- Rec Room is a massively popular virtual reality experience with millions of users. You can play it on iOS, Android, PlayStation, Xbox, Oculus, and Steam, among other devices. In user-created rooms, you can chat and hang out with millions of people, or you can create something new. Customizable avatars, tough games, and more are all available.

- **Cartoon Village**- Cartoon Village transports you to a vibrant mediaeval cartoon hamlet where you are free to explore every nook and cranny. The high degree of detail gives the rural enclave a truly lived-in feel, and you can easily modify the season and time of day to see how it impacts the residents' behaviours and the natural world around them. On devices running Android 4.2 or higher, it can also operate in Daydream mode. In the field of virtual reality, Cartoon Village has already established itself as the cutest CG-rendered app.

- **Via Jaunt VR**- The next immersive horror short from Jaunt is not for the faint of heart. Furthermore, it includes an interactive sound field combined in Dolby Atmos to truly frighten you. You've been given fair warning.

  Apart from these small applications, many growing startups are also in the market. Some major of them are introduced in the following section.

4.4   Augmented and Virtual Reality Startups

Augmented and Virtual Reality industry is booming and thus making its large space in the startups. From construction to shopping, content creation to entertainment, these startups are changing the way how we shop, entertain ourselves and how businesses conduct meets and discuss strategies. Here is the list of such startups-

1. **Vicarious Surgical**

   Vicarious Surgical is solving one of the holy grails of virtual reality tech. This is allowing robots to make surgeries precisely and with highest success rate possible by powering them with accurate movements. The main trick is that a doctor with expertise of a specific surgery can still do it even when he is miles away, with the help of VR headset. By combining doctors knowledge with cutting edge technology, Vicarious Surgical provides access to affordable yet effective medical options to the patients. Microsoft founder Bill Gates also invested in the same.

   Details and Statics-

   Year founded- 2014
   Location- Charlestown, Massachusetts
   Search growth- 3700% (last 5 years)
   Funding- $ 185.2M (Post-IPO Equity)

2. **Holoride**

   The goal of Holoride is to make ordinary car rides into virtual theme parks. The experience is both physical and visceral, thanks to the combination of regular navigational data with automobile data and virtual reality technologies. Car sickness is also not an issue. The experience is a smooth virtual reality adventure with little to no delay between what a user sees and feels, providing an intriguing alternative to reading a book or viewing a movie on a lengthy vehicle ride or travel.

   Details and Statics-

   Year founded- 2018
   Location- Munich, Germany
   Search growth- 3900% (last 5 years)
   Funding- $ 12M (Seed)

3. **Breakroom**

   Breakroom's unique VR technology promises to tackle the difficulties of remote workplace design. Users can experience a virtual working world that more closely resembles the physical office by converting compatible VR headsets into multi monitor systems.

   Details and Statics-

   Year founded- 2014
   Location- Reykjavik, Iceland
   Search growth- 30% (last 5 years)
   Funding- $ 785K (Grant)

5 Metaverse

To hear tech CEOs like Mark Zuckerberg or Satya Nadella talk about it, the metaverse is the future of the internet. To some extent, debating the meaning

of "the metaverse" is similar to debating the meaning of "the internet" in the 1970s. The foundations of a new mode of communication were being put in place, but no one knew what the final product would look like. While it was true at the time that "the internet" was on the way, not every vision of what it would include was accurate.

Here's an experiment to help you understand how nebulous and convoluted the term "metaverse" may be: In a statement, mentally replace the words "the metaverse" with "cyberspace." Ninety percent of the time, the meaning will not vary significantly. This is because the phrase refers to a broad shift in how we engage with technology rather than a single form of technology. Even when the specific technology it originally described becomes mainstream, it's very feasible that the name may become obsolete as well. Virtual reality, which is characterised by persistent virtual environments that exist even when you're not playing, and augmented reality, which blends features of the digital and physical worlds, are two technologies that make up the metaverse. It does not, however, necessitate that those areas be only accessible through VR or AR. A virtual environment that can be accessible through PCs, game consoles, and even phones, such as Fortnite, might be metaversal.

It also refers to a digital economy in which users can design, buy, and sell products. It's also interoperable, letting you to move virtual objects like clothes or cars from one platform to another, under the more idealised conceptions of the metaverse. In the real world, you can go to the mall and buy a shirt, then wear it to the movies. Most platforms already feature virtual identities, avatars, and inventories that are bound to a single platform, but a metaverse might allow you to establish a persona that you can take with you wherever you go as easily as copying your profile image from one social network to another.

It's tough to decipher what all of this means because, when you hear descriptions like the ones above, you might think, "Wait, doesn't that already exist?" For example, Environment of Warcraft is a permanent virtual world where users can purchase and sell items. Rick Sanchez may learn about MLK Jr. through virtual experiences such as concerts and an exhibit in Fortnite. You may put on an Oculus headset and enter your own virtual world. Is that the definition of "metaverse"? Is it only a few new types of video games?

Yes, yes, no. Saying Fortnite as the "Metaverse" is a bit like Google saying it is the "Internet." Theoretically, you can spend a lot of time socializing, buying things, learning, and playing games on Fortnite, but that doesn't necessarily mean it covers the entire Metaverse. Not. On the other hand, just as Google is building part of the Internet from the physical data center to the security layer, Fortnite creator Epic Games is building part of the Metaverse. It is just as accurate to say that you are doing it. And that's not the only thing that does this. Part of that work is done by tech giants such as Microsoft and Facebook. The latter recently renamed to Meta to reflect that work, but I'm still not very familiar with the name. Nvidia, Unity, Roblox, and many other diverse companies, including Snap, are all working on building an infrastructure that could be a metaverse.

It's at this point that most discussions of what the metaverse entails start to

stall. We have a vague sense of what things currently exist that we could kind of call the metaverse, and we know which companies are investing in the idea, but we still don't know what it is. Facebook—sorry, Meta, still not getting it—thinks it will include fake houses you can invite all your friends to hang out in. Microsoft seems to think it could involve virtual meeting rooms to train new hires or chat with your remote coworkers. The pitches for these visions of the future range from optimistic to outright fan fiction. At one point during . . . Meta's . . . presentation on the metaverse, the company showed a scenario in which a young woman is sitting on her couch scrolling through Instagram when she sees a video a friend posted of a concert that's happening halfway across the world.

The video then switches to a concert, where the woman is displayed in an Avengers-style hologram. She can make eye contact with her friends who are physically there, they can both listen to concerts, and they can see the text floating on the stage. This looks cool, but it doesn't advertise the actual product, nor does it advertise future products. In fact, it brings us to the biggest problem of the "Metaverse".

5.1   Market of Metaverse

The Metaverse market is growing due to the steady adoption of XR technology to improve the user experience across different platforms. The growing demand for Metaverse to use cryptocurrencies to buy digital assets is expected to drive the market significantly. The development and adoption of augmented reality (AR), virtual reality (VR), and mixed reality (MR) devices is expected to drive market growth over the next few years.

The hardware subsegment of the product segment dominated the global metaverse market in 2021, and examined the largest market share due to the increase in acceptance of AR, VR, and MR devices. Captures the maximum share of the 2021 hardware subsegment, but the programming motor dominates the software subsegment with the largest market share. The desktop and headset are predicted to dominate the market at 34.9% of total sales and total sales shares in 2021 and maintain the best sales segments during the forecast time. VR and AR Technologies sectors are increasingly integrated with some industries such as Gaming, Healthcare, education, and entertainment offers. Human resource domains also integrate VR and AR devices for employee training with regard to offers, virtual platform segments expect great growth due to the increase in adoption of these platforms for multiple applications such as advertising, branding and scholars, taking into account the largest market share in 2021. Many major actors also recognize that virtual platforms help to reduce investment and operating costs.

5.2 Metaverse Startups

Facebook recently renamed Meta to prepare for the next step in the evolution of the online community. The Metaverse, which fuses innovations from mixed reality, blockchain, and self-sovereign identities, is a new concept for the future of the Web. Consider trying before you buy the product, traveling around the world, or doing hands-on training without leaving your room thanks to a surreal experience. Meta is one of the few big companies investing in Metaverse, but dozens of starters around the world have also reinvented the Internet and reinvented how users interact with Web3.0 and decentralized applications increase. Here are some startups creating the future with metaverse-

1. **Crucible**

   British startup Crucible is developing tools for the Open Metaverse. It provides a self-contained portable ID that allows gamers and developers to securely store all their digital assets in one place. Using WebVR, a framework that brings virtual reality to the web, creators can host walk-through galleries that showcase digital art. Crucible's solution provides future-proof security while allowing users to remain anonymous and responsible.

   Details and Statics-

   Year founded- 2018
   Location- London, UK
   Partner for- WebVR, Digital Identities

2. **Varjo**

   Finnish startup Varjo is developing an immersive reality headset for virtual space collaboration. The startup's premier headset, the Varjo XR3, offers photorealistic visual fidelity over a wide field of view. Use light detection and range measurement (LiDAR) to recognize depth and build a 3D world around your viewers. While collaborating, distant participants feel like they are in the same room. Startup headsets find training, simulation, engineering, and health care applications.

Details and Statics-

Year founded- 2016
Location- Helsinki, Finland
Partner for- mixed reality, virtual reality
Funding- $ 122.5M

3. **Supersocial**

Supersocial is a US-based startup that develops immersive games and experiences. Metaverse is taking the game to the next level as the gaming community is rapidly adopting underlying technologies such as NFTs and virtual reality. This includes games that provide a unique gaming experience in the collective virtual space on the Metaverse. Supersocial Labs, a community of startups, allows Roblox game developers to create games for the Metaverse.

Details and Statics-

Year founded- 2020
Location- New York, US
Partner for- Game development, virtual spaces
Funding- $ 7.1M

6 Summary

While the basic idea of being able to engage in a virtual online world has been around for many years, a true metaverse where lifelike interactions are possible is still years away. But definitely these technologies are going to change the world and going to produce more new startups and businesses. At the same time, these will also help the existing businesses to grow and will open the new ways of business, shopping, marketing and more.

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