

An Insight into the Applications of Virtual Reality Gaming

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Abstract— Virtual reality game or VR games is a video game played on Virtual Reality (VR) hardware. most VR games are based on player immersion, typically through head-mounted display unit or headset with stereoscopic displays and one or more controllers. the video game industry made early attempts at VR in the 1980s, most notably with mattel's power glove and nintendo's virtual boy. with the introduction of the first consumer-ready VR product, the oculus rift, in 2013, VR games soon followed, including existing games adapted for the VR hardware, and new games designed directly for VR. nearly all VR games, as generally defined, require the use of a VR headset that provides stereoscopic displays that simulate three-dimensional reality and create immersion for the player. most headsets include some means of positional tracking as to provide head-tracking some headsets further provide eye tracking. a player may be moved automatically by the game as necessary; a player may need to look at a target location and indicate through a control scheme their desire to move their character to that spot, or the player may use more traditional controls such as an analog stick or keyboard presses to move their characters.

Index Terms— Virtual Reality, Consoles, Headsets, IMARC, Play station, CAGR.

I. INTRODUCTION

The technology you use impresses no one. The experience you create with it is everything. But there comes our virtual reality which not only provides you experience but also impresses the users. Virtual Reality comprises of two words i.e. virtual and reality. Virtual means something that can be regarded as true but is made to appear by computer. Whereas reality stands for that is actually present in world or which is actually true. Virtual reality is an emerging field which is a three-dimensional simulated environment created by computer technology. It has applications in different fields. But one which attracts the most especially youngsters is gaming. Using virtual reality, gaming methods have been changed. Through virtual reality players gain a truly immersive, first-person perspective of game action. Players can even participate and influence the game using virtual reality accessories such as headsets, hand controllers and sensor-equipped gloves and much more [1].

Virtual reality games can be easily played on standalone systems, using advanced laptops and PCs that can power the leading headsets. More complex rooms include treadmill floors or similar ways to further the user's sense of freedom of movement and feelings of immersion in virtual environment. And when we start talking about its benefit there is a lot to cover from being giving an immersive, interactive experience to our balancing our mind. VR gaming helps you to enter a different world to get rid of social anxiety and depression and take you far away

from daily usual hustle. It helps you to boost your confidence by making you feel better, sharper and stronger than ever [2]. It helps in building team management and leadership qualities. Thus, VR gaming is a whole lot of fun and with so many brilliant benefits.

II. RESEARCH METHODOLOGY

There is diverse type of individual and multiplayer online VR games available now right in the market. These games can be easily played on various computing devices such as VR gaming laptop, game consoles and VR gaming towers. Each type of game depends on the computing device that you are using. Not every game can be played on single device [3]. Each game has its own features and compatibility which can't be fulfilled by all the devices.

Thus, there are distinct types of computing devices which are:

- *PCs and Laptops*

Some virtual games can be easily played on personal computers. The games played on PCs provide a detailed virtual environment and game options. These PCs support complex VR headsets such as Oculus Rift and HTC Vive. They can generate rapid frame rates to give realistic virtual worlds. Various games which can be played on laptops are Tetris effect, Beat Saber and Half-Life: Alyx.

- *Game Consoles*

The games played on consoles are very much similar to the games played on personal computers but they only work with game consoles from particular manufacturer. PlayStation VR (PSVR) and PlayStation VR2 (PSVR2) are two capable options for game consoles.

- *Smartphones*

For mobile gaming, smartphone manufacture are introducing their own headsets controllers. Users can install gaming software based on the technology in their smartphones. VR games which can be played on smartphones are VR Galaxy Wars, Incell VR and Hidden Temple-VR Adventure.

A. Headsets

Various headsets being used are:

- o *PSVR 2* – Best VR headset for overall gaming. Its manufacturer is Sony. It is comfortable and even usable with glasses.
- o *HTC Vive Pro 2*- Best VR headset for PC. It has some of the best specs in the market. It's costly and there is a lot of setups.
- o *Meta Quest 2*- Most affordable headset ever. It is the successor to the Oculus Quest, originally called the Oculus Quest 2 which delivers awesome resolution in a lightweight body.
- o *Valve Index*- Best premium VR headset for PC. It is manufactured by Valve. Half -Life: Alyx is bundled with this headset. It is costly.

B. COMPANIES

VR has made some strides and found a home in a variety of industries. Some of its leading companies are:

- o *Oculus SVR (Facebook Technologies LLC)*

Oculus is the leader in immersive virtual reality technology and has already built strong interest among developers, having received more than 75,000 orders for the company's virtual reality headset, the Oculus Rift. It provides an immersive, stereoscopic 3D view with an ultra-wide field of view and low latency head tracking that lets you look around naturally in 360 degrees [4].

- o *HTC Vive*

VIVE, sometimes referred to as HTC Vive is a reality brand of HTC Corporation. It consists of hardware like its titular virtual reality headsets and accessories, virtual reality headsets and services.

- o *Nintendo Co Limited*

Nintendo Co. Ltd. is a Japanese multinational video game company headquartered in Kyoto. It develops, publishes and releases both video games and video game consoles. The company's game consoles include Nintendo Switch and Nintendo 64.

o Valve Corporation

Valve Corporation, also known as Valve Software, is an American video game developer, publisher, and digital distribution company headquartered in Bellevue, Washington. It is a developer of leading-edge technologies including the Source game engine and Steam, a leading platform for digital content offering thousands of games to millions of users around the world.

C. Market

Given the demand for VR in gaming, it should come as no surprise then that more and more gaming companies will be adopting the technology as demand for it grows. In fact, the global virtual reality in the gaming market is forecast to grow rapidly over the next few years. The global virtual reality gaming market size reached US\$ 28.9 Billion in 2022. Looking forward, IMARC group expects the market to reach US\$ 136.8 Billion by 2028, exhibiting a growth rate of 29% during 2023-2028. The growth of the market depends on several factors, including the increasing adoption of VR in the interactive home entertainment industry, the introduction of digital downloading in gaming consoles, and the rising adoption of AR games

The demand for virtual reality in gaming is primarily driven by the rising adoption of advanced VR hardware and accessories among gamers. The increasing number of small and start-up companies is entering the market with innovative software and content offerings. Besides, development in 5G technology, innovative gaming content and cloud-based gaming technology are some of the key drivers of the market. Further, as a part of the business strategy, prominent players are launching advanced hardware and accessories.

For instance, In March 2019, Oculus VR launched Oculus Rift S, an advanced VR head-mounted display device. All VR-powered games available on the original Rift can function effortlessly on the Rift S. The growing demand for VR accessories and wearable amongst users and their probable price fall in the coming seven years is anticipated to drive the market growth. Nevertheless, device compatibility limitations are a challenge that poses a barrier to the industry's growth.

D. Game development

VR game development is the creation of games played using virtual reality hardware. Most VR games require a headset, which stimulates three-dimensional reality through stereoscopic displays. One of the most important considerations in creating a VR game is identifying what tools are right for your project. One of the biggest differences between making a traditional video game and creating a VR game is that VR games are less portable across different types of technology, meaning that you'll need to decide what headset you want to make a game for.

While creating a video game, a lot of steps and activities are done but some of its key points are:

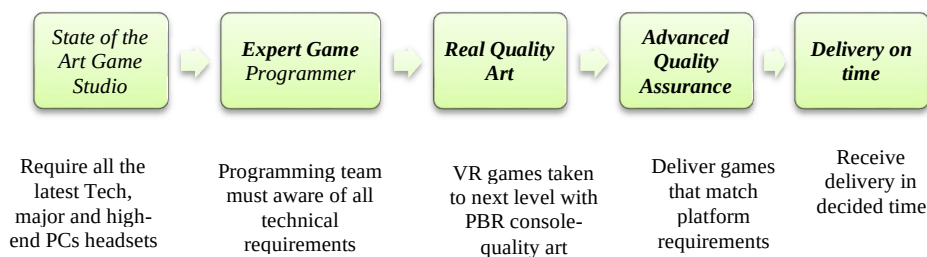


Fig. 1. The given graph states that with the passing time, the market of virtual reality set to be high. This graph shows the revenue growth of mobile, console and PC. According to graph in 2020 the revenue growth of mobile reached US \$8.5, console reached US \$15.6 and PC reached US \$16.3.

TABLE I. IT TALKS ABOUT REPORT METRIC WITH DETAILS

Report Metric	Details
MARKET SIZE 2022	USD 28.9 billion
LARGEST MARKET	NORTH AMERICA
CAGR	29%
BASE YEAR	2022
FASTEST GROWING MARKET	ASIA PACIFIC
SEGMENTS COVERED	Software, hardware
COUNTRIES COVERED	U.S, Canada, Germany, India, UK, Spain, Japan, China, Australia, Brazil and South Korea
KEY COMPANIES PROFILE	Google (U.S.), SAMSUNG (South Korea), HTC Corporation (Taiwan), Sony Corporation (Japan), ZEISS International (Germany)

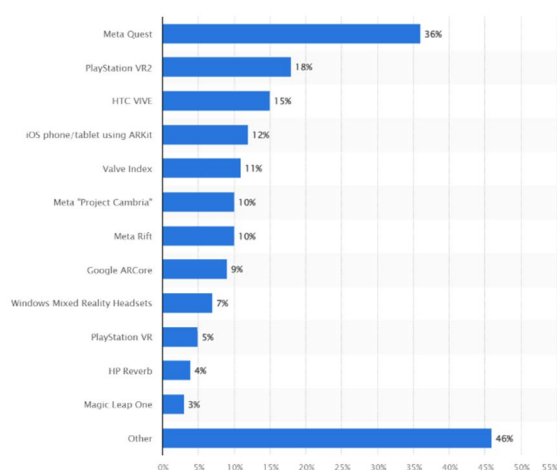


Fig. 2 The above graph illustrates the share of each company in VR market. According to the above graph it is clear that Meta Quest shares the greatest the share in the market i.e. 36% which is followed by Play station VR and HTC Vive.

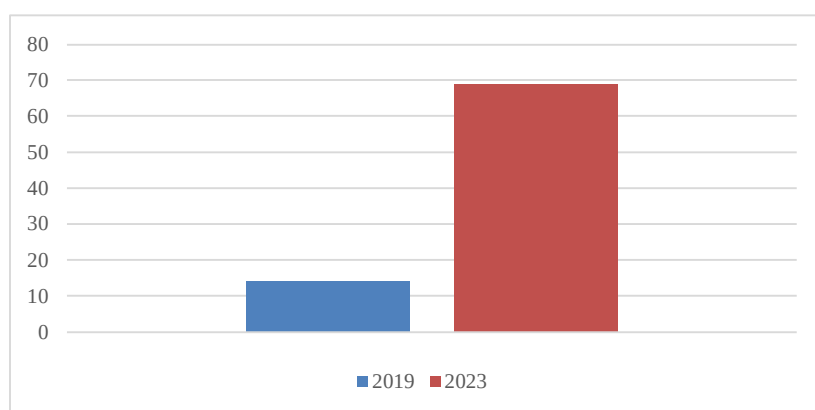
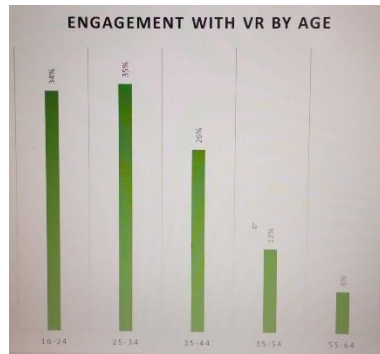


Fig. 3. The given graph shows the percentage of VR devices sold in the particular year till now. It shows that in year 2019 about 14% VR devices are sold whereas in year 2023 nearly 69% of VR devices are sold.

Fig.4. The below graph shows the engagement of particular age group with VR devices. It can be demonstrated from the graph that the adults of age group from 25 years old to 34 years old is the most engaged group with VR devices whereas the old age group of 55-64 years old is the least once.



III. CONCLUSION

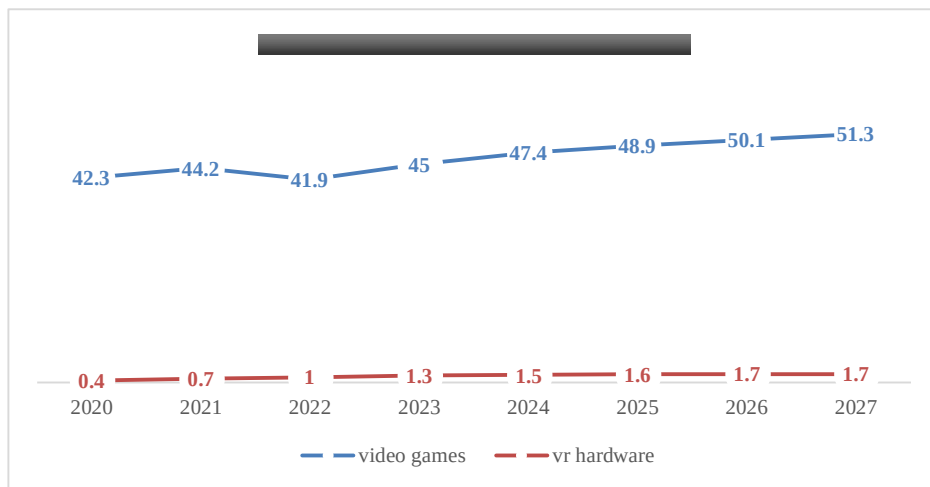


Fig. 5. Above graph illustrates that with time the market of video games and VR hardware's will show a drastic change. The global user penetration rate will be increasing.

To conclude virtual reality is everywhere and you can't imagine your life without the use of technology. Virtual Reality is revolutionizing the gaming industry and shaping the future of gaming and beyond. Whether you're a gamer, a game developer, or just someone interested in technology, the VR gaming industry is an exciting and rapidly evolving field. The VR gaming industry is poised for continued growth and innovation, and the potential for VR technology is virtually limitless. The paper's drawn-out objectives are Virtual reality applications are quickly developing, and they are acquiring foothold in an assortment of ventures. VR is changing the state of affairs done in an assortment of ventures, from medical services to auto, as well as expectations for what's to come are high.

IV. ACKNOWLEDGEMENT

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