

# ECONOMIC POTENTIAL OF VR TECHNOLOGY

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**Annotation.** The article deals with VR technology in general, mainly focusing on its fields of use and economic potential/growth. Significant drawbacks of this technology are also mentioned and analyzed.

**Keywords.** Virtual reality, technology, potential, industry, recreation, VR technology, head mounted display.

Human mind has an interesting ability. It is able to create imaginary worlds much more interesting and exciting than the one we all live in. And naturally every person gets a desire to flee into one of those non-existent wonderlands from time to time. That's why we have books, theater plays, movies and videogames. All those forms of media help us find refuge from the dullness of our world, help us immerse ourselves in the setting provided. Yet they lack the physicality of the experience, we are still detached, staring at some piece of paper, screen or monitor, preventing us from getting fully immersed. That's where VR comes in. It's a completely new form of living through made-up worlds that provides a unique feeling unlike

anything else. And naturally there will be a demand for that said feeling. So let's analyze whether VR is a profitable investment and a promising market, or just a fad that will die out completely in a decade or two.

In order to understand the potential of VR technology one should understand the potential use of aforementioned technology. So that raises a question: "Where and how can we use VR?"

Since its inception in the 1950's and up to early 2010s Virtual Reality had seen very limited use in training and simulation programs for NASA and US Military [1]. Apart from that there were attempts at creating more available VR systems for recreational use, yet those attempts ended up in failure. It wasn't until Oculus developed their prototype that the world got its first look at a conventional Virtual Reality headset. And even though the Oculus VR company intended for their technology to be used for recreational needs (mainly videogames), many saw a much greater potential for this technology. Though nowadays VR's main market is still in recreation. With videogame sales making most of industry's revenue, many other fields of life are showing their interest in this new technology and finding new uses for it.

Healthcare workers use VR simulations and models to practice and to prepare themselves for challenging operations. In automotive industry VR is used by engineers and designers in order to check the visual design of the vehicle and object obscuration of its parts. This technology is actively used by brands such as BMW and Jaguar Land Rover to name a few. Retail industry has found a good use for VR by creating completely virtual shops, where customers can find and interact with goods, that were created using 3D scans of their real-life counterparts. Some real estate agencies began giving their clients online VR tours of properties that were scanned with 3D cameras, saving a lot of time and resources, greatly automating the process. Tourism industry found a similar use for VR, with some travel agencies providing their customers with VR "sightseeing trips". Architects also have found a good use for Virtual Reality technology, using it to gauge their work by immersing themselves into 3D models created by them. For artists VR is still a largely unexplored area, but it shows some promise with appearance of new drawing and sculpturing software, making sculpture and painting creation process much easier and more intuitive [2].

Even though VR is a technology, that has already proven its usefulness and competency as an entertainment tool, there is a number of drawbacks that make many people hesitant to try it out for themselves. First and the most obvious problem with VR headsets is their price. In order to get and enjoy fully a proper high-end PC-connected headset, one would have not only to purchase the headset itself, but also to have a PC powerful enough to run programs for Virtual Reality devices. Apart from that customers need to have a rather spacious room that would allow him or her to move around freely. Even though the price of VR-tech has dropped significantly over the years, with newer models being much more available for an average person, the hefty price is still enough to scare away a lot of customers, who are not willing to purchase an unorthodox and "strange" gadget for several hundred US dollars. The second and the main problem that VR has is its effect on user's health. Many people, using VR, experience motion sickness, dizziness, nausea and headaches. Despite the best efforts of hardware and software developers, there is no apparent way to resolve this issue apart from simply getting used to the feeling of being in a virtual space. What people can't get used to is eyesight loss, which may be induced by extensive use of VR. Virtual Reality has a worse effect on eyes than computer and smartphone screens, due to the displays being so close to the person's eyes when wearing a VR headset. Thankfully slight damage to your eyes is the only permanent effect VR has on human's health. One of the other problems with virtual reality is the fact that it is difficult to set up. Customers are having to tangle themselves in large amounts of cables and to set up tracking cameras in their room that require further calibration. Yet this drawback is soon to disappear as newer headsets lack this problem, as they are connected to personal computers via Bluetooth, or do not require connection to any external hardware, being able to work on their own.

Analyzing the current state of the VR market we can estimate a total net worth of 15.8 billion US dollars. The largest regions are Asia Pacific (China having the biggest share in the market) and North America (USA in the lead) [3]. There are quite a lot of companies in the VR technology business, with Oculus, Sony and HTC doing most of the heavy lifting. As of 2017-2019 these companies produced 78 percent of all Head-Mounted-Displays (HMD) in the world. Sony is the leader, producing 37 percent of VR headsets, whilst Oculus having the largest growth rate out of the big companies. This company doubled its production from 900000 to about 1,7 million units since 2018 up to 2019 [4]. Apart from the so called "VR big guns" many other companies take an interest in the Virtual Reality market, for example Microsoft, Google, Samsung, Apple, Unity and Nvidia. All of those companies create hardware and software for VR technology and are interested in its development. Since the beginning of its popularization in 2014 Virtual Reality market has grown exponentially. For example, the market underwent a 112 percent growth from 2015 to 2016. This rapid growth can be traced back to several factors: novelty of the experience that VR provides, increasing availability to an average consumer, plethora of new technologies and startups that complement VR technology and big companies being interested and ready to invest in VR. Effects of COVID-19 pandemic should also be noted. Like the videogame market, VR experienced a significant increase in sales and revenue, due to mass lockdown and increasing boredom. Though the pandemic affected production volumes negatively, the decrease in the amount of produced HMDs and other VR devices is insignificant comparing it with the increased demand for them.

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Taking into account the fact that currently Virtual Reality technology is situated in the begging of Pierre-François Verhulst's adoption curve, we can expect an even greater increase in public and corporate interest in VR throughout the next decade. There are several predictions as to the future potential of VR. It is estimated to grow Compound Annual Growth Rate of 18 percent. For example, automotive industry is expected to grow at a CAGR of 4.8 percent (by 2025) and IT industry at a CAGR of 5 percent (by 2025). Various business analytics agencies expect VR market to increase in size up to 69.6 billion US dollars. They also believe that Virtual Reality technology will be able to boost global GDP by 1.5 trillion US dollars by 2030 [5].

As a conclusion it can be said that VR is something that is worth the time resources and energy to be put into. It not only has capability of bringing back investor's funds and helping them make a profit, but it also has the potential to revolutionize entertainment, completely change the way many of us work and go about our daily lives. Due to all of those factors Virtual Reality has become one of the fastest growing markets in the world and for the next several years it is predicted that Virtual Reality market will not stop to grow.

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