Implementation of Virtual Reality in Healthcare, Entertainment, Tourism, Education, and Retail Sectors

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2021

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Abstract

Immersive technologies such as virtual reality is continuing to alter cross-industry applications by providing compelling user experiences throughout platforms. Virtual reality has advanced dramatically in recent years, and it is increasingly being utilized in gaming, advertising, entertainment, and staff training programs. Real-life simulations and immersive consumer experience have contributed to virtual reality's broad acceptance in the gaming and entertainment industries. AR and VR technologies appear to have significant potential in a variety of businesses. Owners of businesses could consider using immersive technologies in order to get new consumers and improve their engagement experience. This research aims to explore the applications of virtual reality in different sectors such as: healthcare, entertainment, tourism, education, and retail industries.

Keywords: Education, Entertainment, Health care, Retails, Virtual reality

1. Introduction

Virtual reality refers to a near-reality experience, a three-dimensional (3D) created world in which objects and events seem so genuine that the user feels immersed in their surroundings, based on sensory input and the categorization processes used by the brain. This may be aural (sound) or visual (sight) in nature, or a combination of the two. Virtual reality gadgets enable users to experience a distinct world via the use of a headset or virtual reality helmet. If people are presented with a different version of reality from the one they are now experiencing, their brain will still identify it as a kind of existence (Sherman and Craig, 2003).

Virtual reality (VR) technology permits the creation of a virtual experience in order to imitate real-world circumstances or the creation of a virtual environment with unrealistic components similar to those found in games, allowing for risk-free involvement in a variety of settings and scenarios (Zheng, Chan and Gibson, 1998).

Virtual reality programmers and inventors are rapidly exploring new potential in immersive media, fueled by technologies that alter our perceptions of how we experience, what we observe, and even what we can hear. As the quantity of virtual reality headsets increases, VR is establishing a foothold in the digital ecosystem (Langacker, 1999). By the end of 2021, experts estimate that around 58.9 million individuals will have used VR at least once per month. Figure 1. Shows the prediction of consumer VR devices shipments worldwide from 2021 to 2025.

The cost of implementing this scenario in real life is ineffective in comparison to the expected ROI, but with the assistance of VR and AR techniques, all of the potential uses can reduce the cost of implementing these scenarios for a variety of purposes, including employee training, product trail, location exploration, and project testing (Vince, 2004).

Virtual reality technology is permeating every industry. Finances Online did a survey to ascertain which industries make the most use of virtual reality. The way people amuse, treat, travel, study, interact, acquire products, and work in the future of virtual reality will never be the same. Figure 2 demonstrates the use of virtual reality in different sectors.

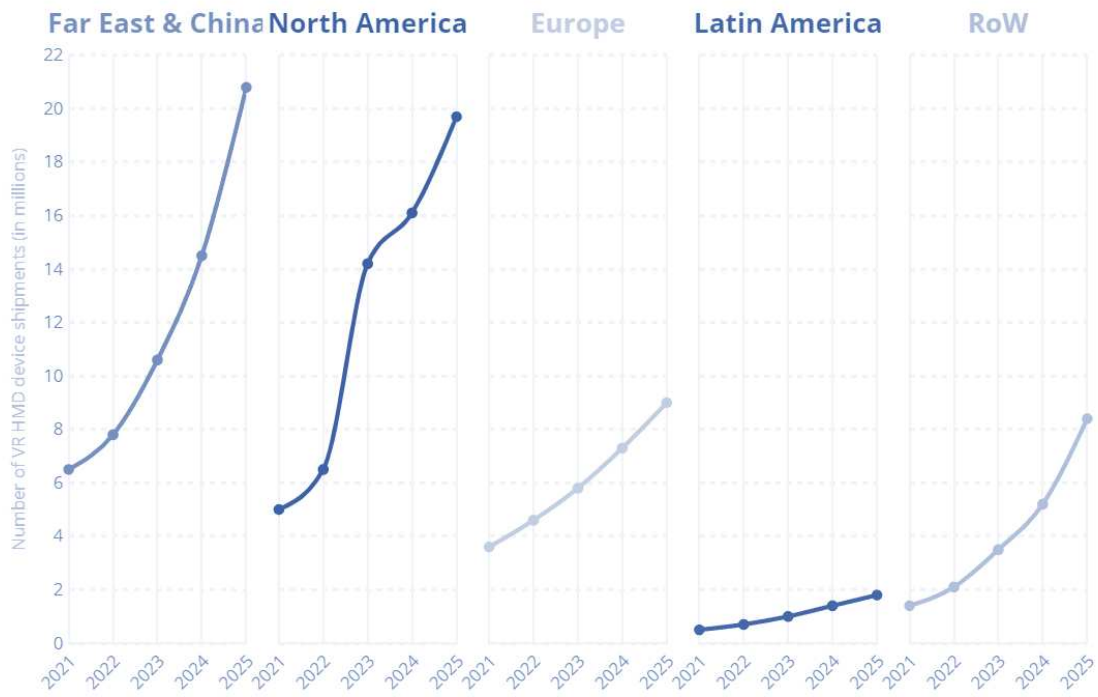

Figure 1. prediction of consumer VR devices shipments worldwide from 2021-25

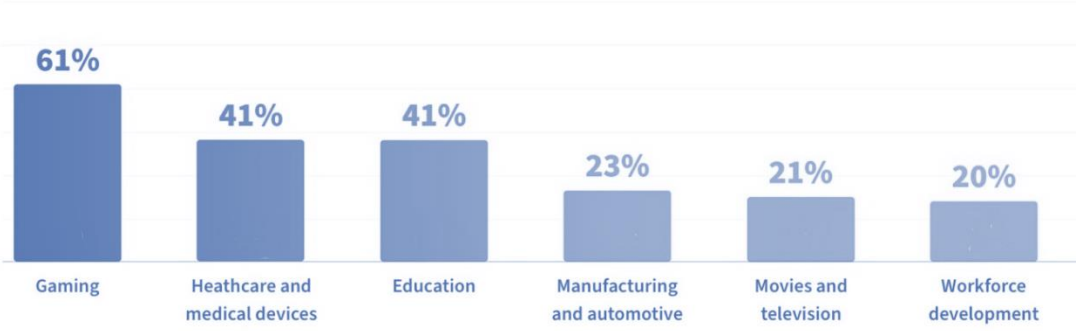

Figure 2. Virtual reality in different sectors. Source: Statista

2. Industries that will gain from virtual reality implementation

2.1 VR in Healthcare industry

Healthcare, like most other businesses, requires a systematic and comprehensive revamp of how we teach our future workers, meet and serve our patients, and live up to the potential of a better world. Virtual reality in medical provides a solution to many of these issues and is being tested, deployed, and actively used throughout the world (Lundström and Fernaeus, 2019) (Abdelmaged, 2021b).

Medical students and new healthcare workers benefit from virtual reality for more productive theoretical learning. Learners may explore 3D medical models in depth, which physical models cannot replicate, or learn to converse with AI controlled virtual individuals, whose attitude and behavior can be readily adjusted for varied learning goals, using VR (von Mammen *et al.*, 2019). Any virtual learning session may be conducted in groups or alone, and it can be directed by a human instructor who is also linked to the VR app, or by a virtual pre - programmed educator managed by AI algorithms.

VR software that emphasizes especially on pragmatic medical training assists both medical school students and healthcare workers in gaining hands-on experience in a risk-free environment. This type of healthcare virtual reality allows for the simulation of scenarios that would be difficult, dangerous, or expensive to replicate in real life. How Virtual Reality (VR) is used in Medical Education: When a user enters the simulated world of a VR app, they become a part of a training scenario in which they are expected to fulfill specified tasks, such as conducting a medical operation or managing medical equipment. A distinct analytical module continually records the activities done and evaluates the performance of a medical practitioner based on predefined criteria (Lin *et al.*, 2018).

VR is employed as a strong diagnostic tool, assisting doctors and physicians in making correct diagnoses. This is done in conjunction with other procedures, such as MRI/CT scans, and removes the need for any intrusive approaches, providing the patient with a pain-free experience (Keswani *et al.*, 2020).

Exposure therapy is a common treatment method for several forms of mental illness. VR is gradually transforming the manner exposure therapy is delivered to mentally ill patients by giving a low-cost, flexible, and low-risk treatment option (Beemster *et al.*, 2019). VR also aids in the treatment of anxiety and panic attacks by giving new techniques to keep the body relaxed and peaceful.

For a long time, clinicians have employed cognitive distraction approaches to manage various forms of pain. VR gives these distraction strategies a new face by offering a variety of interactive activities. Such games are played in a virtual environment and include a variety of interactive elements. While some applications provide therapeutic virtual reality for burn sufferers, there are also substantially enhanced methods that allow for effective limb pain treatment (Greenleaf, 2016).

Furthermore, VR may be employed even without clinical care environments as a drug-free pain treatment option.

The fitness industry is seeing a significant shift in the way activities are performed nowadays. Many industry firms are merging cardio programs with VR to change the way we workout. VR also plays an important part in physical rehabilitation, as patients are exposed to an activity program that includes VR rather than medicines or invasive operations (Hsieh and Lee, 2018) (Shaheen, 2021b).

VR is very useful in different human simulation approaches, allowing doctors and other medical professionals to engage with one another. They may participate in various training programs and interact with patients, but only in 3D. This is an interactive experience that uses a set of sensors to assess the participant's emotions.

In terms of medical applications, virtual reality is still in its early stages. In the future, virtual reality (VR) will most likely be utilized to improve the safety and effectiveness of surgical operations, particularly those that are minimally invasive or non-invasive, as well as to better comprehend the complexity of the human body (Shaheen, 2021a).

However, there have been no large-scale experiments demonstrating its advantages, and it may be confusing and addicting. Furthermore, if low-quality VR tools are employed, the learning may be subpar and perhaps hazardous to the patient.

2.2 Entertainment industry

The entertainment business is divided into many subgroups, including the film industry, the live shows sector, sports, gaming, and theme parks/amusement parks (Kodama *et al.*, 2017). Each of these subcategories may discover unique methods to incorporate Augmented and Virtual Reality. In the live events sector, for example, consumers in one city may see a performance taking place in another city. They may perhaps get a replay and watch it at their leisure. It does not have to be a concert; it may be a play, an opera, or even a comedy performance.

VR amusement parks are expected to provide consumers with novel experiences, entertainment, and thrilling feelings. The entertainment sector changed dramatically with the merger of Virtual Reality technologies. Furthermore, it is considerably simpler to impress guests. The integration of virtual reality creates a one-of-a-kind experience for both individuals and the industry (Bialkova and Van Gisbergen, 2017). VR provides a novel method to emphasize the amusement park while providing classic entertainment.

Musicians and bands stay up to date with the latest technologies. VR provides a plethora of chances to immerse oneself in music in a manner that simply keeps the user captivated (Kodama *et al.*, 2017). It is a whole different immersing experience at a live musical performance. VR in live concerts provides a unique experience for both the performer and the platform hosting VR concerts. The virtual reality event is completely recreated, featuring 3D visuals of the musicians and their surroundings.

2.3 Tourism industry

Technology has helped the travel and tourism businesses expand their reach in recent decades via trip booking websites, movies, blogs, and travel photography (Guerra, Pinto and Beato, 2015).

Vacationers preparing their next trip or establishing a location wish list rely on digital tools and material for information (Huang *et al.*, 2016) (Merkx and Nawijn, 2021). While remote or virtual tourism has been discussed in business circles for some time, the world today, influenced by the COVID-19 epidemic, may be ready to embrace it.

A human-centric design that incorporates ideas from cognitive psychology, social psychology, neuroscience, and behavioral economics and is combined with cutting-edge technology such as augmented, virtual, or mixed reality (AR, VR, MR) might be game changer. AR, VR, and MR can provide viewers with a smooth, continuous interactive experience from the comfort of their own home (Huang *et al.*, 2016) (Tussyadiah, Wang and Jia, 2017). The design concepts will result in a seamless digital user experience and a favorable impression of a tourism site.

Finally, the progress and use of new technology will define the influence of virtual reality on travel. So far, progress has been gradual, and not on a large enough scale to disrupt the travel sector or promote a reduction in travel-related carbon emissions when the epidemic is over. However, just as travel platforms, from printing to social networking sites, provide some of the experiences of physical exploration, virtual reality may bring distant locations closer—and so motivate travelers to adopt sustainable habits wherever they decide to go (or not go) in the future.

2.4 Retail industry

Customers may take their buying experience outside of the store via virtual reality. It's an extension of internet shopping, but this step lets customers to interact with the items rather than merely view them (DeHoratius *et al.*, 2015). Some retailers have already adopted the notion, recently offering it for 'Singles Day.' Shoppers may browse a virtual shop, picking up and inspecting things in 3D before choosing to buy them with a single glance. Visualizing things online with a human touch allows individuals to completely interact and engage in a company. Before they invest their hard-earned money on a product, people want to see what it will look like in terms of quality and style (Vrechopoulos, Apostolou and Koutsiouris, 2009). With more than half of consumers claiming that virtual reality would revolutionize the way they buy, it seems that the concept has a bright future in the retail industry. With over six million VR devices estimated to be sold by the end of 2019, an increasing number of individuals will have access to virtual reality experiences. That is a sizable audience that must not be overlooked. It provides with a differentiator that rivals may be sluggish to embrace (Abdelmaged, 2021a) (de Regt and Barnes, 2019). It is also expected to produce more income due to the attractiveness of personalization and efficiency. However, virtual reality may help more than just online purchasing experiences(Xue, Parker and Hart, 2020).

Virtual reality showrooms, or 360-degree immersive experiences designed to showcase products or services, are not a new technology, but businesses previously saw them solely as a smart marketing tool and a crowd-pleaser at events (Guidi *et al.*, 2010). Virtual showrooms were presented as a creative approach for buyers to examine their items by auto dealerships or luxury fashion firms, but customers still tended to make their purchase selections based on first-hand experience. During the epidemic, however, the retail sector rediscovered virtual reality showrooms as viable replacements for in-person shopping, catalyzing their widespread acceptance (Xue, Parker and Hart, 2020).

Virtual reality has a distinct position in the toolkit of retail marketers due to its demonstrated capacity to evoke powerful emotional responses from viewers. In recent years, there has been a wide range of VR-based promotion campaigns, both digital and offline. These and similar marketing campaigns consistently resulted in a pleasant revenue increase and helped create brand recognition by enabling thorough hands-on demonstrations of goods and services. However, despite their benefits, most in-store installations have been scaled down owing to health and safety concerns (Cruz *et al.*, 2019). While stores are expected to revert to their old methods once the epidemic subsides, the majority have shifted to solely digital consumer experiences, fueling the growth of unique immersive advertising pathways.

Immersive gamification is used by brands to satisfy customers' demand for excitement while also aiding their interaction with the marketed product. Balenciaga, for example, produced a VR video game called Afterworld: The Age of Tomorrow to complement their autumn/winter 2021 collection, which is currently publicly accessible on their official website. Players travel a future setting and solve numerous easy objectives by creating an avatar and dressed in Balenciaga's newest clothing (Machwic *et al.*, 2019). R's involvement in retail extends beyond its usage in-store; it may be employed for research reasons before the general audience is ever engaged. With VR, marketing psychology now has a new weapon in its arsenal: shop planning no longer needs to be a guessing game when one can test alternative layouts before building them.

Using virtual reality to display different items and services might help determine whether suggested ideas will be effective before they are introduced in actual shops. It allows to understand what customers anticipate and how they want to connect with brand. It is very important in the tourism business. It allows customers to have a sense of what their vacation would be like before they invest their money. This not only gets customers enthused about planning a vacation (and hence more likely to spend money booking with), but it also saves the firm time and money on things like descriptions, photography, and videography (Cruz *et al.*, 2019). Everything is connected by a digital environment. When it comes to vacations, buyers like to purchase an experience rather than a commodity, and VR is the ideal way for them to receive the whole experience and test before they buy (Kapusy and Lógó, 2017). Users may also discover films on YouTube, such as this one, that allow to explore various islands and nations, as well as plunge into the water. AT&T, Samsung, and Carnival Corporation have previously experimented with the notion, creating a virtual world that allows users to travel the high seas on a luxury trip. AT&T shops throughout the country were outfitted with headsets to entice customers seeking to experience something new (Alzayat and Lee, 2021) (Pizzi *et al.*, 2019).

Moreover, users may also participate in a competition to win a cruise. It increased brand interaction and attracted individuals who might not have been interested otherwise. It may also be utilized for house design, which is something that companies have embraced. In terms of precision, their virtual reality software is 98 percent correct. It gives users a sense of the texture, pattern, and even how the lighting in your space will alter the appearance of the furniture (Van Kerrebroeck, Brengman and Willems, 2017). Users may construct your ideal living place in a couple of minutes by bringing your designs to life. It also has an unbelievable amount of depth, enabling them to access the kitchen drawers. Allowing customers to examine items in context is preferable in terms of convenience and efficiency (Pfeiffer *et al.*, 2020). However, it also helps the shop by providing a feature that is personalized and caters to the wants of the current customer.

2.5 Education sector

Education is rapidly evolving, and the strategies, tools, and methods of teaching and learning are shifting from conventional to contemporary (Helsel, 1992). Nowadays, education is shifting away from textbooks and blackboards and toward smartboards and smartphones, where listening and watching-based programs replace reading and learning-based programs. What's more, education is becoming more interactive, user-friendly, and cost-effective. Upgrades such as virtual reality, augmented reality, visuals, and animations are crucial in providing the foundation for enhanced learning possibilities (Freina and Ott, 2015).

Rather of learning about the globe via textbooks and movies, VR enables pupils to go anywhere in the world. Immersion in a culture on the opposite side of our world is enlightening and a much more pleasurable experience. Users can accomplish precisely that using a virtual reality headset; there is material available that recreates historical places and events, and even allows them to speak with historical characters (Weinlich, 2018c).

The prominence of traveling to and paying for admission to a large art gallery is decreasing. With virtual reality, users can visit some of the world's most stunning art galleries from any location. Along with the ability to visually visit art galleries, there are some wonderful virtual reality technologies that enable them to make virtual art and express creativities (Panayiotou and Lanitis, 2016).

Virtual reality may be used to teach a variety of subjects, but biology and chemistry are excellent examples. There are instructional biology tools that enable learners to get up close and personal with a variety of hazardous wild creatures, as well as tools that allow you to investigate both human and animal anatomy. Students may also do chemical experiments in a perfectly safe environment by using virtual reality.

Virtual reality has the promise to transform education, but it has yet to be extensively used in traditional classrooms, owing to the high cost of headsets. With education migrating to more online environments, VR might be a game changer in any lesson plan. VR education makes learning more enjoyable, safe, and engaging than ever before (Semião and Carmo, 2008) (Chen, 2019).

5. Conclusion

With technology improving people's lives all over the world, **virtual tourism** has the potential to re-ignite the tourist sector and its people while also contributing to the development of a more sustainable economic model. As a human-centered platform, it has the potential to elevate local tourist guides, craftspeople, and others to the status of global citizens in the tourism business. Virtual reality enables more effective theoretical learning for medical students and new healthcare personnel. Learners may delve deeply into 3D medical models or practice conversing with AI-controlled virtual humans. This sort of training enables the modeling of situations that would be impossible, hazardous, or prohibitively costly to recreate in real life. Virtual reality (VR) is almost

certainly going to be used to increase the safety and efficacy of surgical procedures. The fitness industry is combining aerobic programs with virtual reality to revolutionize the way we train.

Consumers are anticipated to get innovative experiences, entertainment, and exhilarating sentiments at VR amusement parks. Virtual reality in live concerts creates a one-of-a-kind experience for both the artist and the platform hosting the VR concerts. A human-centered design coupled with cutting-edge technology such as augmented, virtual, or mixed reality (AR, VR, MR) has the potential to revolutionize the industry. Over half of people believe virtual reality will transform how they shop. Virtual reality showrooms have been rediscovered by businesses as viable alternatives to in-person shopping.

Brands employ immersive gamification to satiate their consumers' need for excitement and to facilitate their involvement with the promoted product. With virtual reality, marketing psychology gains a new weapon: store planning no longer has to be a guessing game. Utilizing virtual reality to demonstrate various products and services may assist users in determining if their recommended ideas will be beneficial before they are implemented in physical stores. It helps them see the texture, design, and even how the lighting in their environment will affect how the furniture appears.

Allowing consumers to see products in context is more convenient and efficient. Virtual reality enables remote access to some of the world's most magnificent art exhibitions. There are tools available to assist users in creating virtual artwork and expressing your creativity. Virtual reality across different sectors has the potential to make learning more pleasurable, safe, and engaging than ever before. It has the potential to revolutionize each sector.

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