Virtual Reality Technology and Its Developments in Consumer Marketing

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Abstract— Virtual Reality (VR) technology has had a great impact in attracting consumers and getting their attention when it comes to marketing activities. With a special focus to consumer marketing, this article put forwards a conceptual framework for virtual reality in relation to consumer marketing. A comprehensive overview of the practices of virtual and augmented reality is also provided. Based on the framework, future challenges and opportunities opposed by virtual and augmented marketing corresponding to consumer marketing is recommended.

Keywords- Augmented Reality, Consumer Experience, Consumer Marketing, Virtual Reality

I. INTRODUCTION

In today's world technology completely blends with our daily lives. Technology has revolutionized our lives by creating amazing applications and resources, helping us put useful information at our fingertips. All this technology has made our lives much easier, faster, reliable, better, and enjoyable. Through instant messaging apps and other media platforms, technological improvements have given faster means to interact with members of family and friends. Seniors can communicate with loved ones, and caregivers have new ways to keep tabs on aging parents or patients. Technology has altered how we entertain ourselves, interact with one another, and consume various forms of media. It has created amusing developments, but it has also made significant advancements in sectors like home security, corporate area, banking, legal and crime-related advancement, medical gadgets, and the like.

Marketing is not an omitted sector when it comes to technological advancements. Technology has revolutionized marketing by making campaigns more personalized and immersive for consumers. By enabling more integrated and targeted ecosystems for marketers, the customer and business engagement has also developed in a very positive manner. Here we can say that. Not just the relationship between brands and people has changed, but the structures in which companies are built have also seen a drastic change for the better. This elevation towards technological advancements has added value to the procurement facilities offered by different marketing companies. In the retail world, AR technology has been widely used to change how consumers shop by providing virtual trials of products online, via mobile apps, or through digitally-enhanced stores. Customers also have been seen enjoying this immersive

experience, as it has brought about changes in the way how shopping is done. VR also has elicited better immediate advertising effects than traditional advertising in terms of ad recognition, consumer's attitude toward the brand, brand loyalty, and consumer's intention to buy a product or service.

Advertising, which is one of the major activities of marketing has also seen a major tilt toward the growing need and advancement of technology. One of the major fields in which advertising has been progressing is in the field of virtual reality (VR) and augmented reality (AR). How radically will only become evident in the next months and years, but huge corporations, particularly if we take the example of the video game sector, they are already leveraging it to great advantage and spending substantially on this relatively new technology to create new experiences for customers. The headsets aren't as common as smartphones, tablets, or even smartwatches, but that's to be anticipated given that the technology is still in its early stages and several variations have yet to be released. However, the manufacturers of VR and AR headsets are enormous, providing marketers the confidence to invest in leveraging the technology as a potential advertising tool. The big giants in the technology sector are Google, Apple, Meta, and other applications like Snapchat, TikTok, and the like can be taken as exemplary witnesses of how the virtual reality and augmented reality has an enormous shift in the present time. Also, if we see the past times, we can see a distinct view of the adaptations of virtual reality. Influencers are people who have intentionally built up massive social media audiences, often by aggregating and commenting on other people's content. Some influencers, like top Instagram influencers, TikTok stars, and YouTubers, make seven or eight-figure incomes from endorsements and media contracts.

II. THE CONCEPT OF VIRTUAL REALITY

Computer graphics have developed to the point that images are often indistinguishable from the actual world. Computer-generated graphics in games, movies, and other media, on the other hand, are very different and away from our physical environment. This is both an advantage and a disadvantage. Virtual reality (VR) is a computer-generated simulation of a situation that includes the user, who sees it through one or more of the senses (now largely vision, hearing, and touch) and interacts with it realistically [15].

A. Definition of Virtual Reality

Virtual reality simulation ''Simulations that use a variety of immersive, highly visual, 3D characteristics to replicate real-life situations and/or health care procedures; virtual reality simulation is distinguished from computer-based simulation in that it generally incorporates physical or other interfaces such as a computer keyboard, a mouse, speech and voice recognition, motion sensors, or haptic devices'' (Lopreiato et al., 2016).

''An artificial environment which is experienced through sensory stimuli (such as sights and sounds) provided by a computer and in which one's actions partially determine what happens in the environment; also: the technology used to create or access a virtual reality.''[18].
Virtual reality is categorized into three different, which are, non-immersive, semi-immersive, and fully immersive. Different levels of computer-generated simulation are provided by three types of virtual reality experiences. Besides these three categories of virtual reality, we can add two more to this list, which is, augmented reality and collaborative virtual reality.

### B. Technology, Advertisement, and Customer Response

Virtual reality is not a new concept. It cannot be termed holistically as a new term. It has been there for years and is still going to be here for the long run. Virtual reality has been gaining popularity immensely. The concept of virtual reality was coined by an American scholar Jaron Lanier in the mid-1980s. Lanier was the founder of VPL Research where he began to develop the gears, including goggles and gloves, needed to experience what he called "virtual reality." Scholars have also summed up the qualities of virtual reality technology, which may be classified into three categories: immersion, imagination, and engagement. Immersion, for example, refers to the ability of the three-dimensional world created by virtual reality technology to turn users from observers to participants, allowing them to truly function in the virtual world [11]. Just recently Metaverse has become a huge topic of discussion almost in every sector. Users can enter the metaverse through virtual reality. Many high-end brands have also come into the space of Metaverse.

Marketers and brands have grabbed this as an opportunity and have utilized it to build a good relationship with their prospective as well as loyal customers. Depending on the device, virtual reality marketing might be visual or multi-sensory. A full virtual reality headset provides a fully immersive experience, whereas a virtual reality Instagram filter only overlays objects or photographs onto the camera view [2].

III. CONCEPTUAL FRAMEWORK

For this study a conceptual framework was proposed relating virtual reality experience and consumer marketing. The framework was adopted from Wedel, E. Bigné, and J. Zhang, Virtual and augmented reality: Advancing research in consumer marketing, International Journal of Research in Marketing. This framework is shown in Figure 1.

Fig: Conceptual Framework
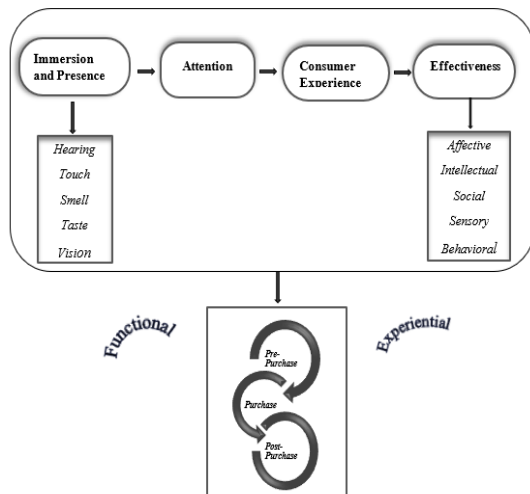
Source: [19]

A. Immersion and Presence

The process of being available physically in a non-physical world can be termed immersion. Immersion is an output that occurs when the use of VR devices is made. The application use of all VR devices is specific. Immersion is the user's engagement with a VR (virtual reality) system that results in being in a flow state. Immersion to VR systems mainly depends on sensory immersion, which is defined as "the degree to which the range of sensory channels is engaged by the virtual simulation" [4]. VR themes instrumental to flow include the avatar, application quality, and

interactivity. Contrary to some conceptualizations of VR, it is found that all applications can produce flow [5].

The interaction with the virtual world is quite useful. This interaction must be kept in mind because when recording sounds, they come in handy when interactions are made in the virtual space. Higher levels of engagement and presence caused music to have a greater modulating effect on behavior [3]. Haptics is also a vital part of the virtual reality space. The term haptic is used in experimental psychology and physiology to describe the ability to actively explore the environment with our hands, such as when palpating an object to measure its shape and material features. This is known as active or haptic touch, 3 and it involves the use of cutaneous and kinesthetic talents [12].

Presence within the context of virtual reality is defined as one's sense of being in the virtual world. The illusion is perceptual but not cognitive, as the perceptual system identifies the events and objects and the brain-body system automatically reacts to the changes in the environment, while the cognitive system slowly responds with a conclusion of what the person experiences are an illusion [17].

The conceptual framework in the area of virtual reality had been highly considered in the advancements and developments, especially in marketing communications. Presence, means a sense of being physically present in a virtual setting. Functional and experiential flow also have equal contributions to developing interest among users. For users to be more participative in a particular application (action), makers of these applications should make more engaging content and sites [7]. This would enhance user participation, which would in turn be beneficial for developers and marketers. The flow of activity would also increase the number of loyal customers. On the other hand, potential customers would also increase in number due to the decent offerings made by developers and marketers.

B. Attention in Virtual Reality

The world today has become very usual and a place of opportunity amongst people. The level of competition in almost every field is on the rise. This has contributed to many wonderful innovations. The same goes for marketers who learn and earn from this. The marketing world is

going also seeing many new advancements which have led to the adoption of VR in the marketing world as well. Like immersion and presence, attention also plays a very important role in making a successful advancement toward virtual reality.

C. Consumer Experience

Consumer experience is described as the subjective contact that customers have with the brand or company, both directly and indirectly. In marketing literature, customer experience is divided into five key dimensions. The term BASIS was coined by Hoffman and Novak, where the abbreviation is, Behavioral (motor actions), Affective (joy, anger, sadness, fear, surprise, disgust), Sensory (vision, audition, touch, taste, and smell), Intellectual (cognitive) and Social (relational) [7]. The framework that is designed for this study has Consumer experience is more than a feature of a consumer's response to stimuli; it's a framework whose creation is dependent on interactions between consumers and products.

D. Application in Virtual Reality

Contextual cueing is the process through which the environment (products, sceneries) awakens appropriate memories, motives, and rules for perception and behavior [9]. The application environment is expected to alter the impact of consumer experience on the effectiveness of VR applications, in addition to influencing the links between immersion, presence, attention, and consumer experience.

E. Effectiveness of VR

The BASIS classification for this study was taken from Hoofman and Novak 2018. To access the effectiveness of virtual reality four types of data are explained: objective, digital, neurophysiological, and self-reported data [1]. The analysis of how to evaluate the quality of these signals in detail and these metrics, taken together, describe a VR system's objective level of immersion (Akhtar & Falk, 2017). The documenting of these technical aspects in VR experiments is crucial for the replicability of VR investigations [1]. Second, using microphones, motion-trackers, cameras, and haptic devices, spoken instructions and motion of the head, hands, torso, face, and eyes can be digitally recorded [10]. Field metrics such as shopping time, product evaluation time, and product handling time can all be easily collected

using these measures [13]. Third, wearables can be utilized to measure neurophysiological signals such as heart rate variation, electrodermal reactivity, respiration rate, and vocal pitch while also facilitating VR's responsiveness to these signals. Fourth, self-reported data from questionnaires and qualitative interviews supplement observational data. Researchers will be able to examine the immersion-attention-presence-customer-experience chain in a range of VR marketing applications using the combination of these of data.

IV. CONSUMER PURCHASE EXPERIENCE IN VIRTUAL REALITY

After 2020, the pandemic changed the way teams and employees connect, the function of virtual reality as a tool for customer experience has gotten more attention. Many retailers and businesses had to close. While most brands found this to be a profoundly disruptive experience, it also revealed new prospects for digital interaction. Consumers' VR store experiences produced favorable feelings and boosted perceived store attractiveness when compared to a standard retail website [8].

Using VR in marketing activities can help boost loyal customers and attract potential customers as well. It can be regarded as an investment where after a business pr a brand comes up with a product or service, easier ways can be adopted as to how sales of the product or service can be enhanced. Companies can utilize VR to create training experiences that educate users on how to use the most important aspects of a new piece of equipment in new and engaging ways.

A. Pre-purchase stage

Consumers have their eye on virtual and augmented reality. The competition between brands and companies is also increasing at a fast pace. Big and luxurious brands have always put in their efforts in impeccably presenting their products and services. Here's how VR could transform advertising. Coca-Cola, Timberland, IKEA, Michael Kors, Sephora, Bobbi Brown, and Pottery Barn, among others, quickly followed suit with packaged products, fashion, accessories, cosmetics, furniture, gaming, and entertainment. While many of the apps are spatial, visual, or audio, the Immersion Corporation creates haptic advertising that uses smartphone sensations. The effectiveness of these advertisements has been

proven in studies [6]. Customers nowadays are looking for experiences that are authentic, engaging, interactive, and personal. VR is the ultimate platform for emotionally interacting with your audience. Virtual reality provides users a completely immersive experience. One of the most difficult aspects of experiential marketing is capturing and holding your target audience's attention. Virtual reality removes external distractions, allowing you to gain your potential customer's undivided focus. One of the advantages of a fully immersive experience is that it encourages active consumption of your product rather than passive consumption.

- Removing uncertainty from Decision-Making

It used to take a lot of imagination to figure out whether a piece of furniture or a new household appliance will look good in your home. This could explain why furniture has taken so long to make the transfer to the internet; a physical visit to the showroom was sometimes required to complete the mental image of your home with that new sofa. Shoppers can use augmented reality to turn their houses into virtual stores. Ikea Place, allow buyers to visualize furniture in their own house before purchasing it using their smartphone. Which color will best suit the arms of the sofa, is the sofa too big for the room, Is the refrigerator going to fit into the kitchen nook, are examples of some questions that customers might be able to find answers to [14].

- Interactive packaging

Packaging is an important part of a product. It shows how a product is seen in the eyes of customers. Brands can offer exciting and entertaining activities for their consumers. A practical use like Heinz packaging, which offers recipes and interactive cookery demos utilizing its products as a component. This list also includes other brands like McDonald's, which are always engaged in coming up with new innovative ideas to keep their customers happy and entertained.

B. Purchase stage in VR

Virtual reality has been proven to increase purchase intention among consumers. In-store experiences are the most obvious arena where AR and VR solutions can be used. A customer always recognizes what is offered in the store. The experience inside the store also assists in purchasing decision of a product. It can benefit from the navigation and information features of AR and VR to improve the customer experience. AR routing can illustrate were what a customer is looking for is located. IKEA Place and Amazon AR View allow customers to place things in their homes using their smartphones or an interactive showroom with a head-mounted display (HMD). The competition among brands can be seen increasing day by day. Beauty apps are taking the guesswork out of choosing a new look through innovative uses of augmented reality customer experience. RayBan has the try before you buy feature that allows customers to try on their shades before buying. Virtual reality apparel apps designed by Gap, named Dressing Room by Gap, allow its customers to choose from a virtual shelf equipped with it.

C. Post Purchase Stage

The post-purchase stage cannot be neglected when it comes to customers. The post-purchase stage is regarded as one of the most important phases of the purchase decision. Google Arts & Culture, according to Fast Company, has partnered with over 2500 museums and galleries across the world to deliver anybody and everyone virtual tours and online exhibits of some of the world's most famous museums.

Customers may now use strong AR-based self-service to help brands improve their post-sales service. Customers can use their smartphones to access the product's knowledge base, which includes FAQs, manuals, and training materials that are displayed in an AR overlay. AR boosts practical features of tailored marketing, sales, and technical assistance via a smartphone by increasing information and interaction capabilities

V. DISCUSSION

The VR technologies are continuing to evolve and have reached a point where further realistic developments in various sectors can be seen. With immense developments comes responsibilities as well, since consumers and business houses are in constant contact with the technological developments taking place. This imposes certain challenges and opportunities in virtual reality.

One key challenge is privacy concerns. Customers are reluctant to share their private information, data, and pictures online. They have their concerns about how their information is used

that is shared by them on online platforms. How is data managed in virtual reality? Because highly personal data from VR players might be misused, corporate leaders must plan carefully for cybersecurity. As digital companies collaborate to develop a networked metaverse in which users' avatars can move between worlds and games, data privacy will become ever more vital. When customers try on clothes in virtual changing rooms, they are putting their physical data at risk. Customers can secure their physicality in real life by locking doors, but their physicality may be compromised when completely immersed in a virtual world by existing recording technologies.

Customers can be provided with safety warnings and disclaimers that properly advise them of the risks connected with using virtual reality technology. Marketers should commit to being honest and transparent about the biometric data and intelligence they collect to improve the consumer experience.

A second key challenge is the adoption of consumers toward technology. Customers might briefly hesitate to cope with the challenges that come up when using applications in VR. Poor user experience might also be a cause of the adoption towards consumers.

Longer health implications can also be another challenge since customers may spend a whole lot of time in the metaverse or the virtual world. Motion sickness, vision problems, or psychological effects are some of the most common problems that might be seen in individuals. Steps that can be taken to counteract cyber-addiction must be taken by business houses and leaders. These personal and societal hazards must be recognized by business leaders, who must work hard to guarantee that their VR applications are ethical.

Virtual reality can aid research prospects in different fields of study. If we specifically speak about marketing, VR can extend its opportunities for research in multi-channel marketing, new product development, consumer marketing, branding, communications, advertising, and the like.

VR can also be used in advertising, especially on online platforms like Instagram, Facebook, YouTube, etc. VR enables advertisers to contribute toward more personalized ad experiences. This allows users to have unique experiences in the advertising and consuming space. The use of both digital and physical channels to advertise a product or service also enhances the proper use of VR technology. Be it funny face filters or interactive makeup filters, social media apps are trying their best to provide their customer base with a good and unique experience.

VR can be used in research to improve the physical attributes of products, ads, and stores. VR can contribute to the development and research of product innovation. Product prototypes are created by brands. Virtual prototyping allows brands to design their products correctly the first time. It also reduces cost since the dependency on physical prototyping is less. It is also said that brands or companies that adopt virtual prototyping come up with higher quality products for the marketplace. The product development process is another field in which VR comes in handy. For example, engineers can better investigate the errors in an automobile when a digital car crash is performed. Every step is properly monitored and better results are out when a digital crash test is performed.

VI. CONCLUSION

Virtual reality technology has been extensively used in many industries and sectors. One of them being marketing. The influence of VR in the marketing field is immense and will continue to be so much as to the core of consumer behavior, the role of VR is humungous. Different research has anticipated the influence that XRs will have on numerous facets of our existence [16]. Other studies also predict that smartphones will have extended versions of artificial intelligence to address consumer activities and understandably interpret them. The use of VR by several major companies also gives hope and optimism toward further advancements in virtual reality. VR has already been contributing to the marketing sector and will continue to do so in the future as well. Furthermore, the demonstration that the impact of using virtual reality technology in advertising communication is far superior to that of advertising communication on a mobile phone or a computer.

The concept of virtual stores is also burgeoning. Virtual stores make customers less price sensitive. Without having to travel, consumers will be able to have a good consumer experience and studies have shown that consumers try to accommodate friends in a more collaborative buying in the virtual space.

Multidisciplinary disciplines can also be determinants in the research area of consumer marketing and virtual reality. Simultaneously marketing researchers should keep in mind the limitations that come in the way when aligning these many different disciplines together. All in all, researchers, marketers, and consumers should be aware of the constant innovation and progress that is taking place in the era of virtual reality technology. Due to the increase in digital audiences, marketers have left no stones unturned in exploring the marketing opportunities. Marketers and brands have understood the importance of branding strategies that have enabled customers to deepen their digital storytelling experience.

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