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THE ROLE OF IMMERSIVE TECHNOLOGIES IN VALUE CREATION IN MARKETING

ABSTRACT

Technological innovations and their potential as a tool for creating added value in marketing have long been underused, or insufficiently researched. This paper describes the use of immersive technologies and their potential for application in marketing. The use of immersive technologies in marketing has great potential and has attracted a lot of attention in the last few years. Incorporating the use of the concept of immersive technologies is increasingly becoming the subject of research in business and marketing. Initiating the use of immersive technologies in modern business is becoming the root of managing and creating a completely new customer experience. Reality can be shaped by using this type of technological innovation and as such immersive technologies with their role create an extraordinary position in communication with users. The use of immersive technologies, especially the use of Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (MR) has been used successfully in the entertainment sector for some time, but it becomes clear that there is a much greater need for immersive technologies in various fields and industries to recognize them as a huge potential for value creation in marketing.

Keywords: *Immersive technologies, Virtual reality (VR), augmented reality (AR), mixed reality (MR), marketing*

JEL: *M30, M31*

1. INTRODUCTION

This paper deals with the role of immersive technologies in creating added value in marketing. Technology is one of the most important factors in economic development. The use of technology significantly increases the amount of added value for each person. The potential for wider use of certain technologies can be very large and have a significant economic impact. Innovation as a concept in economic research was introduced by Schumpeter.

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He viewed innovation as the cause of particular economic change (Schumpeter, 1942), while he viewed technological innovation as the basis for the accelerated execution of business processes. The advent of immersive technologies such as Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (MR) technologies are shaping a new environment in which physical and virtual objects are integrated at different levels (Flavian et al., 2019). "Immersive technologies" is an umbrella term commonly used in the technology industry to describe technologies such as augmented (AR) and virtual reality (VR). These technologies blur the lines between what is real and what is not (Milman, 2018). In most cases, the term immersion is used to describe experiences in which someone is "immersed" in something like art, cinema and gaming (Kitson, et al., 2018), but in technology-related areas immersion describes the extent to which computer screens are capable of providing an inclusive, extensive, environmental, and vivid illusion of reality (Slater, 1997). Over the last few years, these technologies have been gaining growing interest among researchers and marketing professionals (Flavian et al., 2019). Every day we witness how immersive technologies enter our homes, penetrate the business environment, facilitate our learning, provide better solutions in medicine, and for a long time have been used daily for fun and relaxation. This paper should lead us to a better understanding of how the use of immersive technologies such as virtual reality (VR), augmented reality (AR) and mixed reality (MR) can create added value in marketing, which is important to encourage marketers to use them in their marketing activities and campaigns. The problem with this research stems from the need for more thorough research to find important factors that will lead marketers to use immersive technologies.

2. Theoretical framework

At the International Mobile Congress held in Spain, Mark Zuckerberg, one of the founders of "Facebook", said that virtual reality will soon become a new social platform and change the world. To develop this trend, Facebook has taken over VR (Virtual Reality) equipment maker Oculus (Sosnilo et al., 2021). Virtual Reality (VR) is an artificially created 3D digital world that allows people to locate in any time and space. With the help of sensors and peripherals, the virtual world looks almost real. The rapid advancement of technology, above all the rapid advancement of hardware and software, is making immersive technologies increasingly popular and affordable in a wide range. Augmented Reality (AR) helps to get in front of you a 3D visual image of any object or thing, the ability to rotate in space and enlarge or reduce it (Chang et al., 2020). Extended Reality (AR) complements and upgrades perception with digital information.

Engineers can use 3D models of engines or transmissions, in medicine surgeons can handle patient magnetic resonance imaging, engineering system developers can handle objects related to the environment and surrounding buildings, and a teacher can demonstrate atomic or DNA models. Immersive technologies such as augmented reality (AR) and virtual reality (VR) are not only used in many industries, but can help students gain an impressive learning experience to improve their learning effectiveness and motivation (Chang et al., 2020). Education centers around the world have begun to introduce powerful new tools based on this technology to meet the needs of different student groups. In recent years, virtual reality (VR) and augmented reality (AR) have shifted from gaming to professional development. Immersive technologies are taking on an important role in the teaching process and are now providing a more interesting way of gathering information (Chang et al., 2020). Immersive virtual and augmented reality technologies can provide companies with a competitive advantage, such as improving the quality of products and services, reducing costs, and making employee training easier and faster. The application of immersive technologies to achieve marketing goals, at first glance, may seem less common, but examples of their use are numerous. Almost all leading IT companies such as Amazon Microsoft, Sony, Google, Adobe, Samsung and Acer are developing these technologies and applying them to their business. Also, the world's leading brands such as Nike and Pepsi, as well as retail chains such as Walmart and Alibaba, have recognized the potential of immersive technologies and used them in their marketing campaigns and virtual stores (Sosnilo et al., 2021).

3. Immersive technologies

The term immersive technology refers to technology that intends to imitate, more precisely mimic the physical world using a digital or simulated world by creating a surrounding sensory feeling, thus creating a sense of immersion in that world or immersion (Pavithra, 2020). Immersive technologies also provide us with the possibility of mixed reality in such a way that it is possible to create a combination of virtual reality and augmented reality or a combination of physical and digital. According to Pavithra, immersive technologies have been widely used in several areas, and the expansive application of these technologies can be seen in retail and e-commerce, tourism, art, entertainment and computer games, and interactive storytelling, military, and enormous applications in education, medicine and architecture (Suh and Prophet, 2018). Immersive technologies are being developed at a high speed and are being adopted for use (Javornik, 2016). Immersive technology provides the ability to integrate some virtual content with the physical environment and thus provides the user with the ability to naturally engage in such a combined reality (Pavithra, 2020).

There are many definitions of immersive technologies and they are in themselves broad and changeable, but they all start from the assumption that the user feels as if he is an integral part of the simulated "world". Such a digital immersion environment can be a model of any reality, but it can also be a completely fictional user environment or a complete abstraction, as long as the user is "immersed" in it (Suh and Prophet, 2018). The success of such a digital environment in which the user can actually immerse himself depends on many factors such as convincing computer graphics, sound quality, etc. The constant development of technology allows immersion to become better every day, and devices used are cheaper and more available (Huang and Liao, 2015). There is a lot of work on the example of the use of immersive technologies in the world. Research has been done in a variety of areas, such as education (Frank and Kapila, 2017), marketing (Huang and Liao, 2017), entertainment (Arino, et al., 2014), and healthcare (Zhao, et al., 2016). Research has shown that the use of immersive technologies improves learning experiences (Huang, et al., 2016), encourages participation in joint activities (Fonseca, et al., 2014) and increases creativity and engagement. According to Pavithra (2020), advertising using immersive technologies is a completely new format of advertising that differs from the techniques of traditional advertising. Pavithra says that this new ad technology takes advantage of the mobile phone's touch inputs making it very effective for mobile advertising. Experiential marketing is one of the very common ways to use immersive technologies in marketing in such a way that interactive counters can be set up at fairs, shopping malls or sports events where users have the opportunity to interactively experience promotions (Huang and Liao, 2017). Online shopping has taken on a whole new meaning with the use of this technology. There are more and more stores that use AR applications to provide users with this opportunity to test products in advance (Pavithra, 2020). Manufacturers within the automotive industry use virtual showrooms where customers can view cars and enjoy virtual test drives, while in medicine immersive technology provides a huge advantage to medical students and physicians by being able to perform simulations of operations, and can help physicians watch the performance of other remote operations, even from a first-person perspective. Education has and can have a wide range of benefits from immersive technology because it has the ability to touch the different senses of the human being, in addition to the audio and visuals used so far, which has severely limited the ability to learn more effectively. Immersive technology such as AR or even MR allows students to gather knowledge about the human body and its functioning by overlaying digital images on a real person and highlighting where different parts are located (Pribeanu, et al., 2017). The gaming and entertainment industry is one of the first drivers of the use of immersive technologies (Arino, et al., 2014). As a result, gaming and immersive technologies have become almost synonymous with each other.

3.1. Virtual Reality (VR)

One of the immersive technologies is Virtual Reality (VR), which is one of the new technologies that is widely discussed in the scientific community, among consumers and marketers. The term "virtual reality" was first mentioned in the mid-1970s as a way to explain human-computer interaction (Williams and Hobson, 1995). Burdea and Coiffet (2003) insist that virtual reality (VR) is a world created by computer-generated 3D technology and refers to a 3D virtual representation of the real world or objects within it. Virtual reality can also be defined as a computer-generated, three-dimensional interactive environment (Suh and Lee, 2005). So virtuality is a notion of something that is not real, that is, it is not present in a physical sense but depicts an imaginary or reality that can be experienced by the human senses including sight, touch, hearing, and smell (Howard, 1992). Due to the extremely rapid development of technologies as well as lower production costs, Virtual Reality (VR) has recently become commercially available. Virtual reality technology has been used in practice for some time and is the subject of writing scientific papers, from education (Bruer, 2008) to medicine (McGrath et al., 2018) and human resources (Alcaniz et al., 2018). Jung et al., (2018) suggest that virtual reality (VR) can be used effectively in many environments, including education, aesthetics, and entertainment, as well as to escape social presence. Virtual reality (VR) is also a new opportunity for marketers. Virtual reality (VR) can provide new touchpoints for users in marketing, and that experience does not require an actual client visit and experience. The possibilities of using advanced VR technology in marketing are very high and innovative. Exploring the relationship between new virtual technology and the brand is a new interest. Rauschnabel et al., (2019) argue that a positive consumer experience of virtual technology can increase brand inspiration, which in turn can favorably change a user's attitudes about the brand. There are other business applications for virtual reality (VR). Business education, training and immersion of marketing campaigns through VR simulation are other fields in which virtual reality (VR) has the opportunity to provide new opportunities. Therefore, it should come as no surprise that marketers are very interested in Virtual Reality as a new marketing channel. The very large interactive capacity provided by Virtual Reality and new innovative content has so far not been available to marketers, scientists and industries. Previous studies on the use of Virtual Reality (VR) in marketing are beginning to reveal to us the enormous potential of these marketing research tools.

By reviewing previous research and relevant articles, virtual reality (VR) is used in computer games. Virtual reality (VR) provides a different and new dimension to reality and engagement in computer games. The virtual world of the game we play surrounds us, giving us opportunities to explore it and communicate with the characters.

These characters can be avatars used by other participants in the game or they can be completely fictional characters generated by a computer. In research to date, it can be observed that the use of virtual reality (VR) will have wide applications in healthcare. Patients with phobias or post-traumatic stress disorder have in some cases found relief through virtual reality-based treatments, helping them to gradually cope with situations that cause discomfort. Also using virtual reality, medical staff and surgeons have the ability to plan and investigate complex medical procedures by assessing virtual patients created by magnetic resonance imaging. Driver and pilot training through simulations is a classic use of virtual reality (VR). Simulators that use virtual reality are closed rooms that are made on a mechanical platform that reproduces situations and movements that can happen in reality while flying and / or driving. In such spaces, pilots and drivers have the ability to manipulate realistic controls while reacting to different conditions in flight or driving. Also, excavators, cranes, trailers and other commercial and construction simulators, provide greater safety and driver confidence.

The advantages and disadvantages of using virtual reality will largely depend on the user's own experience. For those who use virtual reality applications both at home and at work, it may even be possible to create opposing perspectives on whether the advantages outweigh the disadvantages or vice versa when it comes to comparing the computer systems we have at home with the systems at work. Using virtual reality applications gives the possibility of greater efficiency in performing certain tasks and duties, faster than performing the same task by, say, using a pen and paper or a pen and a book. Virtual reality applications also offer the storage of capacity efficiency results, which in turn provides the ability to improve and compare. We can take the example that virtual reality applications and the hard disk of one such system that takes up a relatively small amount of space can do the storage of a large number of business or paper documents, as well as training or learning results. On the other hand, archives or files would take up at least one, and usually many more, cabinets or file rooms to store the same collection of documents.

Virtual reality (VR) applications provide an opportunity to further encourage learning activities in young but mature people, as well as to adapt to different learning styles. In an office environment, computer training through the use of virtual reality applications provides flexibility in management training. At this sophisticated level through the use of virtual reality applications, training may include simulations of complex situations that users may encounter in their profession. Both the military, aviation, as well as commercial aviation, and the medical profession use virtual reality simulations in some of their training activities. Enterprise management also has the ability to flexibly modify teaching activities with more traditional forms of training, such as classroom training, etc.

Rapid developments in technology can cause computers and systems we use to become obsolete relatively quickly, requiring constant upgrades and improvements in computer systems, especially in professional use. Excessive reliance on computer systems and virtual reality applications can also provide some users with a sense of false security that can result in catastrophic losses or errors while performing real-world jobs and tasks. Likewise, children who spend excessive time using virtual reality have fewer opportunities to learn social good manners or cooperate with other children and the environment in which they live. Adults whose work involves the use of virtual reality to the extent that social interaction is restricted may feel isolated or cut off from the world. While domestic workers may suffer from the greatest sense of isolation, it can also affect certain employees of traditional businesses.

3.2. Augmented reality (AR)

Augmented reality (AR) is a modified and upgraded image of an already existing reality and is part of the continuum between the real and the virtual, as defined by Milgram in 1994 in his article (Kishino, Milgram, 1994). Augmented reality has many definitions and views by different authors from the scientific or practical fields. The term Augmented Reality (AR) refers to the integration of a real representation of the world with added digital information about it. Real objects and people gain an informational aura of data that, when captured and intelligently processed, can offer exceptional value to consumers (O'Reilly and Battelle, 2009). AR applications are being developed with the purpose of combining the real and virtual worlds with each other in a user view of the physical world in real-time (Carmigniani et al., 2011). This greatly helps to improve product visualization, perception of the store environment, and thus the shopping experience, as it allows the possibility of interaction with virtual items (Huang and Liao, 2015). While the use of Virtual Reality blocks real-world sensory experiences by using a portable headset, simulating the user's immersion in virtual and fun 3D worlds (Bonetti et al., 2017), Augmented Reality (AR) provides users with the opportunity to gain enhanced experiences. More realistic experiences within a physical place (Papagiannidis, et al., 2017). Augmented reality (AR) can be defined as a combination of real and computer-generated digital information in a user's view of the physical world in such a way that it is presented as a single environment (Olsson, et al., 2013). By integrating real and virtual objects (through a virtual layer that can add computer-generated digital elements such as images, videos, textual information, etc.), this technology results in an improved (enhanced) physical environment. A review of the relevant literature and scientific papers written on the subject of augmented reality (AR) suggests that augmented reality (AR) is a technology that expands our physical world by adding layers of digital information.

Unlike virtual reality (VR), augmented reality (AR) does not create entire artificial environments that will replace the real environment with virtual ones. Augmented Reality (AR) is manifested in a direct representation of physical reality and adds sounds, videos and graphics to the existing environment. Augmented Reality (AR) is a view of the physical environment in the real world with overlapping computer-generated graphics, videos and sounds thus changing the perception of reality. 3D augmented reality (AR) models are directly projected onto real physical objects or merged in real-time. Various augmented realities (AR) have an impact on our habits, social life and the entertainment industry. Augmented Reality (AR) applications typically associate a digital animation with a special "marker" or use GPS to determine the location of the phone's GPS. Reality augmentation occurs in real-time and in the context of the environment in which it is used, for example, to overlay results for live sporting events.

In the literature, we can find that several types of augmented reality (AR) are mentioned. Extended reality (AR) based on markers or as in some texts also called augmented reality with image recognition because it requires a special visual object and a scanning camera. The visual object can be anything from a printed QR code to special characters. The AR device also calculates the position and orientation of the content placement marker, in some cases. Thus, the marker launches digital animations for users to view, so images in the magazine can be converted into 3D models. Augmented reality (AR) applications without "markers" or augmented reality that use GPS, compass, gyroscope and speedometer to provide data based on user location. This data then determines what augmented reality content you find or receive in a particular area or time. With the availability of smartphones, this type of augmented reality usually produces maps and directions, and information about companies, tourist attractions or nearby monuments. Applications include events and information, business ad pop-ups, navigation support, and more. Augmented reality (AR) applications are based on projection or more precisely the projection of synthetic light on physical surfaces which in some cases provide the possibility of interacting with the same. These are actually holograms that we've all seen in science fiction movies like Star Wars and in some marketing campaigns. Augmented Reality (AR) applications are based on superimposition. Such augmented reality applications replace the original view with augmented ones, in whole or in part. Object recognition plays a key role, because without it the whole concept would simply not be possible. The best example of this type is the application used by IKEA in its catalogues, which allows users to place virtual items from the furniture catalogue in their rooms. Considering the above, we can also see what other potential spheres are for the use of augmented reality (AR).

Other potential areas for augmented reality (AR) can include education such as the use of interactive models for learning and training purposes, in mathematics, chemistry, etc. The use of augmented reality in medicine and health care where these applications can be used to help diagnose, tracking, training, localization, etc. Augmented reality applications can be used in art, exhibitions and music. Tourism has great potential to use augmented reality applications such as destination data, sightseeing facilities, navigation and directions, and media when broadcasting live event enhancement programs and streaming events by covering content.

3.3. Mixed Reality (MR)

Virtual reality transports and immerses users in an imaginary or alternative world by providing a wide range of interactive possibilities. Whereas, Mixed Reality (MR) with a blend of VR and AR introduces changes to the way users create, connect and collaborate with the new holographic experience (DeSouza, 2016). According to Pavithra (2020) this is why Mixed Reality (MR) is a more interesting choice for industries trying to improve their operational efficiency by using holographic experience. Mixed Reality (MR) has become a common goal for a large number of companies due to its distinctive features compared to other immersive experiences. Mixed Reality (MR) is able to produce enterprise-focused applications with the best combination of both physical and digital worlds. This is why many companies are entering the race to develop Mixed Reality (MR) applications to deliver a new digital experience to their customers (DeSouza, 2016). Mixed Reality (MR) is a mixture of real and virtual worlds in which physical and digital objects coexist and create real-time communication. Mixed Reality (MR) has the ability to map physical environment, tracking gestures and language processing for voice recognition and more. Mixed Reality (MR) provides a new way of working with the use of communication and the practical execution of an operation or job in companies because it offers a new experience in reality (Pavithra, 2020).

By reviewing the literature and papers related to mixed reality (MR) we can conclude what is the difference between mixed and virtual reality. If we compare them, virtual reality has its limitations because it completely blocks the user's environment and thus, requires the user to be stationary and stay in place. In the second case, mixed reality (MR) refers to the user's current environment along with 3D images and thus creates a continuous view of both worlds; virtual and real. Also, with MR technology the user is allowed to be on the move and thus stay productive in performing their jobs and tasks. This is one of the main advantages of MR over VR, where MR has a greater impact on businesses even though VR is still in its development phase. Mixed reality (MR) industries can be found in the literature.

Mixed Reality (MR) can have applications in industrial environments where it can improve operational efficiency from assembly lines all the way to supply chains using mixed reality displays worn by employees. Using mixed reality (MR) devices, manufacturers can perform design, maintenance of products and machines, better quality inspection and more, all in real-time cooperation with different teams across the organization. Even a mixed reality solution is perfect for the ability to quickly prototype, visualize 3D models, and make faster decisions (Pavithra, 2020). Mixed reality (MR) applications have many factors that can help with health, such as simulated 3D exercise rooms, virtual models of organs when reviewing or performing operations. This is a powerful way to transform knowledge and skills combined with data analysis, sensors and artificial intelligence.

In retail, stores using mixed reality (MR) applications can offer a new and better experience to their customers, such as visually checking designs, and moving around some objects in real-time. One of the best examples is Lowe retailers, who use HoloLens headphones and thus provide the opportunity for their customers to build a kitchen of their choice using a generic exhibition space template (Pavithra, 2020). In the literature used in this paper, it is mentioned that the use of MR applications is used by construction and real estate dealers who provide clients with a complete virtual display of real estate in development or in the planning phase using mixed reality. Furthermore, clients can also make decisions about furniture design, wall colours, etc.

4. CONCLUSION

The market is increasingly unpredictable and competition is increasing day by day and as such forces marketers to implement new innovative ways to create and offer added value to customers in order to retain and acquire new ones. We live in a digital world, and in this regard, the use of information technology such as smartphones, video content, social networks and other platforms have become indispensable tools for communicating with customers. Accelerated development of technology daily contributes to market transformations, and thus the business of companies. One of the key transformations will be the opening of new market opportunities using immersive technologies, primarily virtual (VR) and augmented reality (AR). In this regard, it is no big surprise that we have recently witnessed many companies integrate the use of immersive technologies into their marketing strategies. We are witnessing that in the last few years, investment in these technologies has been growing rapidly and that they are constantly being improved while reducing prices. Immersive technologies such as virtual (VR) and augmented reality (AR) are gaining momentum in the consumer market while companies like Apple and Facebook are announcing large investments in this field, sparking many discussions about the future of immersive technologies (Hoium, 2021).

Immersive experiences quickly take center stage in strategies to increase "engagement" with customers. By combining the latest augmented and virtual reality solutions, retailers are making virtual assistants smarter and more affordable than ever. As the number of smart homes, Smart cars and related technologies continue to increase all they can learn about our preferences and proactively deliver targeted content and information based on previous interactions. Immersive intelligence will become increasingly important in terms of its popularity and impact on the way we work, live and play. To monitor our personal health, our habits when shopping or performing daily tasks, the possibilities are endless.

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ULOGA IMERZIVNIH TEHNOLOGIJA U KREIRANJU VRIJEDNOSTI U MARKETINGU

SAŽETAK

Tehnološke inovacije i njihov potencijal kao alat za kreiranje dodane vrijednosti u marketingu je dugo vremena nedovoljno iskorišten ili nedovoljno istražen. Ovaj rad opisuje korištenje imerzivnih tehnologija i njihovu mogućnost za primjenu u marketingu. Upotreba imerzivnih tehnologija u marketingu ima veliki potencijal i u zadnjih nekoliko godina privlači veliku pažnju. Inkorporiranje korištenja koncepta imerzivnih tehnologija sve više postaje predmetom istraživanja u poslovanju i marketingu. Iniciranje korištenja imerzivnih tehnologija u modernom poslovanju postaje korijen za upravljanje i kreiranje potpuno novog iskustva kupaca. Stvarnost je moguće oblikovati korištenjem ove vrste tehnološke inovacije te kao takve imerzivne tehnologije sa svojom ulogom kreiraju izvanredan položaj u komunikaciji sa korisnicima. Upotreba imerzivnih tehnologija, posebno upotreba virtualne stvarnosti (Virtual Reality), proširene stvarnosti (Augmented Reality) i miješane stvarnosti (Mixed Reality) se izvjesno vrijeme uspješno koristi u sektoru zabave, ali postaje očigledno da su mnogo veće potrebe za korištenje imerzivnih tehnologija u različitim oblastima i industrijama te da su iste prepoznate kao ogroman potencijal za kreiranje vrijednosti u marketingu.

Ključne riječi: *Imerzivne tehnologije, Virtualna stvarnost (VR), Proširena stvarnost (AR), Miješana stvarnost (MR), Marketing*

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