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AUGMENTED REALITY (AR) AND VIRTUAL REALITY (VR) IN ENHANCING THE CONSUMER EXPERIENCE IN ECONOMY 5.0

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Abstract

Augmented Reality (AR) and Virtual Reality (VR) are innovative technologies that have great potential to improve the consumer experience in the Economy 5.0 era. Through AR and VR, consumers can interact with products and services in a more personal and in-depth way, enabling simulations and virtual experiences that reduce uncertainty and increase trust. In various industries, from retail to education and tourism, AR and VR create a more interactive and engaging environment, enriching the user experience and supporting more informed decisions. The implementation of this technology not only fulfils the practical needs of consumers, but also the emotional and cognitive aspects, supporting the creation of long-term relationships between brands and customers. Thus, AR and VR contribute to a more sustainable and human-centred economic ecosystem, in accordance with the principles of Economy 5.0.

Keywords: Augmented Reality (AR), Virtual Reality (VR), Consumer Experience, Economy 5.0

Introduction

The Economy 5.0 era is a human-centred economic concept in which technology and innovation are used to improve the quality of life and welfare of the community. One of the main pillars of Economy 5.0 is the use of advanced technologies such as Augmented Reality (AR) and Virtual Reality (VR). Augmented Reality (AR) is a technology that integrates digital elements, such as images, sounds, or other sensory data, into the real-world environment in real-time (Slater, 2009). By using devices such as smartphones, tablets, or special AR glasses, users can see additional information added to their physical world. For example, in shopping applications, AR allows consumers to see how furniture will look in their home without having to physically move it. The purpose of AR is to enrich the user experience with relevant and interactive information, which can increase efficiency, engagement, and situational understanding in various applications, including retail, education, and entertainment (Azuma, 1997).

On the other hand, Virtual Reality (VR) is a technology that creates a fully digital environment that users can explore and interact with. By using a VR headset and other devices such as controllers, users can experience the sensation of being in a specially designed virtual world. VR is used for a variety of purposes, from games and entertainment to training and simulations for medical, military, and other industries (Billinghurst et al., 2015). The main purpose of VR is to provide a truly immersive experience that can put users in situations or environments that are difficult or impossible to access in the real world. By creating a realistic and immersive experience, VR is capable of producing more effective training, more immersive entertainment, and more accurate visualisation (Milgram & Kishino, 1994).

Augmented Reality (AR) and Virtual Reality (VR) are technologies that have shown great potential in various industries, from entertainment and education to retail and advertising. According to data from the International Data Corporation (IDC), global spending on AR/VR is expected to increase from $12 billion in 2020 to $72.8 billion in 2024. This shows a high level of interest in this technology as a tool for creating added value in consumer interaction (Bowman et al., 2000).

In the retail sector, for example, AR allows consumers to 'try on' products virtually before buying, while VR can provide a fully immersive shopping experience. The use of this technology not only increases consumer engagement but can also reduce the rate of product returns that do not meet consumer expectations (Lombard & Ditton, 1997).

Although AR and VR offer many benefits, the application of this technology still faces several challenges. One of the main challenges is the relatively high cost of development and implementation, which can be a barrier for small and medium enterprises. In addition, the lack of awareness and education about the potential of AR and VR also hinders wider adoption across industries (Capgemini, 2018).

According to a survey conducted by Deloitte in 2021, only about 20% of companies have used AR or VR technology as part of their business strategy. Most companies are still in the exploration or trial stage, and many are hesitant to take the next step due to the lack of concrete evidence regarding the long-term benefits of the investment (Yoon & Anderson, 2010).

In this context, this study aims to explore ways in which AR and VR can be used effectively to enhance the consumer experience in the Economy 5.0 era. This study will also identify the challenges and opportunities in the application of this technology and formulate strategies that companies can implement to maximise the benefits of AR and VR.

Research Methods

The study in this research uses the literature method. The literature research method is a systematic approach to collecting, reviewing, and interpreting information

from various written sources relevant to a particular research topic or question. It involves the identification, evaluation, and synthesis of existing literature, such as books, journal articles, research reports, and other reliable sources, to build a strong theoretical foundation or identify knowledge gaps in the relevant field of study (Okoli, 2015); (Randolph, 2009). Literature research aims to provide an in-depth understanding of the latest developments, trends, and debates in the field of study, as well as to highlight consistent or contradictory findings. This process also helps researchers formulate better hypotheses, research questions, and methodologies for further research. Good literature research ensures that new research is based on a deep and contextual understanding of existing knowledge (Grant & Booth, 2009).

Results and Discussion

The Role of AR and VR in Enhancing the Consumer Experience

Augmented Reality (AR) and Virtual Reality (VR) have revolutionised the way consumers interact with products and services. These two technologies take the consumer experience to a new level by presenting interactive and immersive elements that were previously impossible. AR and VR offer a more engaging and personalised way for consumers to experience and understand products, from planning to purchase (Jung & Dieck, 2017).

In the retail industry, AR is used to create a more interactive shopping experience. For example, when consumers use an AR application to try out cosmetics virtually, they can see the results of the product directly on their face without having to physically use the product. This not only makes the shopping process more enjoyable, but also helps consumers make better decisions quickly. In addition, using AR to display products in their physical environment, such as indoor home furniture, helps provide a clearer picture of how the item will fit into their decorating plans (Augmented World Expo (AWE), 2022).

VR has taken the entertainment experience to the next level by creating a fully immersive virtual world. In the gaming industry, VR allows players to enter and interact with the game world directly, creating a real sense of presence. This not only increases user satisfaction and engagement, but also opens up new opportunities for game developers to create more complex game narratives and mechanics. In addition, the application of VR in films and theme park attractions offers more immersive and realistic cinematic and ride experiences, providing consumers with extraordinary memories (Takatalo et al., 2008).

Both AR and VR also have an important role in the field of training and simulation. In the context of customer training, for example in the automotive or real estate industries, AR can be used to provide consumers with interactive guidance on how to use a product or explore car specifications. VR, on the other hand, allows consumers to experience driving a car or exploring a property without having to be in a physical

location. In this way, customers can obtain accurate and useful information, which in turn will increase their trust in the product and the company (Lanier, 2017).

The increased engagement that comes from interactive and immersive AR and VR experiences directly translates into increased customer loyalty. When consumers can interact with a brand through this cutting-edge technology, they feel more connected and are more likely to return. For example, a shop that offers an AR shopping experience or an exciting VR promotion will leave a lasting impression on its customers, encouraging them to return and make purchases in the future (Steuer, 1992).

AR also plays an important role in offering personalised content that suits the needs and preferences of each individual. For example, a shopping app using AR can suggest products based on the user's purchase history or preferences. Even in the hospitality and tourism industries, AR can be used to provide consumers with real-time information about nearby tourist attractions, restaurants, or activities based on their location. The accuracy of the information offered through AR helps consumers make better decisions, while personalisation increases their comfort and satisfaction (Think with Google, 2020).

Overall, AR and VR offer revolutionary ways to enhance the consumer experience by making interactions more engaging, informative, and immersive. As this technology continues to evolve, the opportunities for various industries to improve their customer experience are endless. Smart AR and VR implementations can bridge the gap between products and customer experiences, driving greater engagement, better decisions, and stronger brand loyalty. Ultimately, the integration of these technologies not only gives companies a competitive advantage but also benefits consumers by making their experience more enjoyable and satisfying.

The Impact of AR and VR on Various Industrial Sectors

Augmented Reality (AR) and Virtual Reality (VR) are bringing about a major revolution in various industrial sectors. In the world of entertainment, these two technologies have changed the way people enjoy content. VR, for example, allows users to have a highly immersive experience of video games, films, or concerts. This experience is much more intense because it gives the illusion that the user is in a real virtual world. Meanwhile, AR changes the way users interact with their real environment by adding digital elements, which are very popular in games like Pokémon Go and other augmented reality applications (IEEE VR Conference, 2022).

In the healthcare sector, AR and VR technologies play an important role in medical training and surgical procedures. Doctors and medical personnel use VR to simulate operations that help them hone their skills without risking patients. AR, on the other hand, can be used to provide real-time guidance during surgery through goggles that display medical images such as CT scans or MRIs directly in the surgeon's view. This significantly improves efficiency and accuracy in medical procedures (IKEA, 2017).

The education sector also benefits greatly from the application of AR and VR. With VR, students can visit historical sites or conduct scientific experiments in a safe and controlled environment. AR helps to make textbooks and educational materials more vivid by adding interactive 3D animations and visualisations. This not only increases student engagement, but also enables a more enjoyable and effective learning approach (Blascovich & Bailenson, 2006).

In the manufacturing industry, AR and VR are used for product design, employee training, and equipment maintenance. AR can provide real-time visual instructions in the assembly or maintenance of machines, which reduces errors and increases productivity. VR is used for simulation and prototyping of new products before they are mass-produced, which saves time and costs and enables faster and safer design iterations (Meta, 2021).

In the fields of architecture and real estate, AR and VR provide new ways for architects and clients to consult and visualise building designs. VR enables virtual tours of buildings that have not yet been built, which helps clients understand the design of the space in more depth before construction begins. AR can be used to see design changes directly at the construction site using mobile devices or AR goggles, which makes project coordination more efficient (Welch & Foxlin, 2002).

Finally, in the retail sector, AR and VR are changing the way consumers shop and interact with products. VR enables a realistic virtual shopping experience where consumers can explore and buy products from the comfort of their homes. AR allows users to try on products virtually, such as furniture or clothing, by displaying images of the products directly in a real environment via a mobile phone or other device. This increases customer satisfaction and helps reduce the rate of returned goods.

Thus, the application of AR and VR in various industrial sectors shows the great potential of both technologies to change the way we work, learn, shop, and interact with the world around us.

Challenges and Opportunities in the Application of AR and VR in Economy 5.0

In the 5.0 economy era, which is characterised by the integration of advanced technology in every aspect of human life, Augmented Reality (AR) and Virtual Reality (VR) present a variety of opportunities and challenges. Both technologies have the potential to drive operational efficiency, enhance the user experience, and open up new types of work. However, to fully realise this potential, we must first overcome several significant obstacles (Welch & Foxlin, 2002).

One of the main challenges in implementing AR and VR is the cost issue. This technology is still relatively expensive, both in terms of hardware and software development. The cost of producing, maintaining, and updating hardware such as VR headsets and AR goggles is quite high and often unaffordable for many small

businesses. In addition, the content required for realistic AR and VR environments also requires a large investment in terms of design and development (NVIDIA, 2021).

Another challenge is technical limitations. AR and VR require high-performance hardware and a stable internet connection to function properly. In many areas, especially in developing countries, this infrastructure is still inadequate. Latency, graphic resolution, and device durability are technical obstacles that must be overcome to provide an optimal user experience. These limitations need to be addressed through continuous innovation in technology and infrastructure (Drascic & Milgram, 1996).

On the other hand, the application of AR and VR opens up many opportunities in the 5.0 economy era. In the field of education, the opportunities for creating more in-depth and interactive learning experiences are endless. The health sector also sees countless potential applications, such as in surgical simulations and remote patient care. Virtual reality can enable doctors to perform guided surgeries from experts in remote locations, reducing risk and improving surgical outcomes (Slater, 2009).

In the business and retail world, AR and VR enable unprecedented personalisation of the customer experience. Consumers can try products virtually before buying, reducing purchase risk and increasing customer satisfaction. For example, in the fashion industry, customers can see how clothes will look on them without having to physically try them on. This not only increases customer satisfaction, but also reduces return rates, which are a major problem in e-commerce (Azuma, 1997).

In addition, the integration of AR and VR in training and workforce development shows great potential in improving employee skills in a more efficient and safe way. In manufacturing, for example, employees can practice using large and complex machines in a virtual environment where mistakes will not damage equipment or endanger safety. This allows them to acquire the necessary skills faster and at a lower cost (Schuemie et al., 2001).

By addressing the challenges and taking advantage of the opportunities presented by AR and VR, Economy 5.0 can achieve significant progress in the way we work, learn, and interact. Although there are obstacles to overcome, the continuous development of technology and improvement of infrastructure will pave the way for a wider and more effective application of this technology, enabling the global economy to grow in ways we never imagined before.

Conclusion

The conclusions from this research are as follows:

First, AR and VR have the potential to change the way consumers interact with products and services, creating more personal and immersive experiences. In Economy 5.0, where technology and humans collaborate to achieve a higher quality of life, AR and VR present an interactive world that allows consumers to try products virtually

before buying. This not only increases consumer engagement but also builds trust and reduces uncertainty in decision making.

Second, AR and VR enrich the customer experience across various industries, from retail to education and tourism. In the retail sector, for example, AR allows consumers to 'try on' clothes or beauty products without physically touching the items, while VR can take customers on a virtual tour of a shop or showroom. In education, VR enables more interactive and in-depth learning, while AR enriches lesson content by adding digital elements that interact with the real world.

Third, the application of AR and VR in customer experience is in line with the vision of Economy 5.0, which prioritises a holistic and human-centred approach. This technology not only improves the practical aspects of consumption but also fulfils the emotional and cognitive needs of consumers. By providing a richer, more intuitive and engaging experience, AR and VR help build long-term relationships between brands and customers, as well as supporting a more sustainable and humane economic ecosystem.

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