

Analysis of the current status of additional reality technologies

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Abstract. The modern virtual reality industry holds a lot of potential since its investment activity has been increasing as well as the new breakthrough projects and technologies have been emerging. However, this field is still not so widespread. The article is devoted to the analysis of the VAMR-industry current state, to the research of the topical issues that do not allow the industry to become a part of the user's daily life, and to the search of their possible solutions. The definitions of 'VR', 'AR', 'MR' and the statistical data of the investment activity and the industry growth rate in 2016-2018 are given. The article considers the VAMR-industry problems from the perspective of a user in accordance with the price, usability, security and quality criteria. Here are described features of augmented reality technologies and their formats, basic principles and methods of its use. The specificity of the concept of augmented reality in the context of retail and industrial trade and its use in consumer and industrial marketing in the relevant markets. The tools and elements of augmented reality that influence the activity of enterprises, their positions and support in optimization of their digital strategy of the company are identified.

Keywords: virtual reality industry; VAMR-industry; modern technologies; VAMR-industry problems; marketing instruments; reach of the target audience; customer behavior.

I. REALITY TECHNOLOGIES

Currently, Virtual, Augmented and Mixed Reality (VR / AR / MR) is an emerging industry with great potential. The first steps towards the development of virtual reality technology were made in 1957, when the working prototype "Sensorama" (the Sensorama) was released.

However, the active growth of the VAMR industry began not too long ago. In 2012, a breakthrough was made in the industry - Oculus Rift virtual reality glasses were created. The appearance of this product marked a new stage in the development of VAMR.

Trends in the steady increase in growth and expansion of virtual technology in different areas not only characterize the current state of the market, but also create a number of complex and contradictory problems that require mandatory search and development of solutions.

II. PROS AND CONS OF REALITY TECHNOLOGIES

In practice, the difficulties in the development of the VAMR industry go far beyond terminology. The growth rate and investment attractiveness of the market are indicators that not only characterize the level of development of a given

industry, but also reflect its scope and problems that need to be overcome.

– On the one hand:

– VAMR is a promising industry (see Fig. 1). Transparency Market Research (TMR) estimates that VR and AR's global CAAGR (cumulative average annual growth rate) will reach US \$ 547.20 billion by 2024 [1]. According to 2018 data, North America, which owns 80% of the world market, is the leader in the region's use of VR / AR technologies. [1] In 2017, the largest amount of investment in the VR / AR industry among all countries in the world belonged to the United States and amounted to \$ 3.2 billion [2].

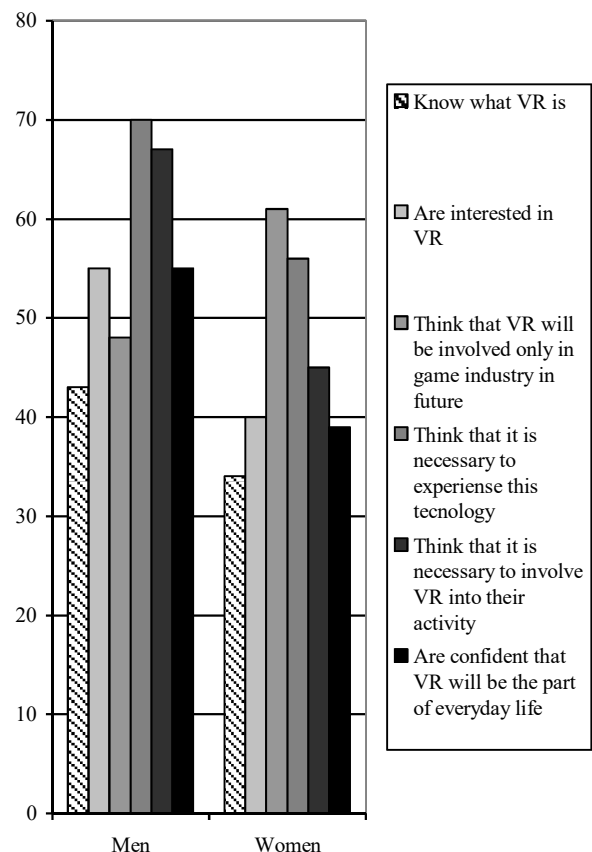


Figure 1. VR value in human life

– VAMR solutions are used today in various fields: entertainment (games, cinema, sports broadcasts, theaters, museums, etc.), marketing, education,

medicine, industry, real estate, military-industrial complex, design, etc. there are many examples of successful cases using VAMR technologies worldwide and in many areas.

- However, the gaming industry on a global scale still remains the area where VR devices are most in demand.
- The annual VR market volume for gaming was \$ 106 billion in 2016 [1].
- On the other hand:
 - Despite all the above trends and positive dynamics, the VAMR industry is still too young to become a full-fledged in the real-life of a user at the same level and scale as mobile communications, internet, or television. This thesis is confirmed in the downturn of 2017, when companies worldwide acquired only 24 thousand sets of AR points [2,3]. If you look at the dynamics of sales of VR points in the gaming market over the past two years, the following trends can be noted.
 - In 2016, Samsung Gear VR was the number one device sold (see Fig. 2). In 2017, this figure has dropped significantly. In most cases, the glasses were bundled with the Samsung Galaxy device of different versions, which, in our opinion, is the cause of the decline in sales.
 - Consumer motivation was related to buying a smartphone, not a VR helmet. At the same time, Playstation VR sales have more than doubled, driven by an increase in games on the platform [2].
- Conclusions:
 - The above data indicate that current and projected high rates of growth, investment activity, number of players in the market and production volumes characterize the VAMR industry as a whole, but do not explain the reasons for the lack of widespread availability, lack of mass virtual technology and mixed technologies in different segments (corporate and private clients).

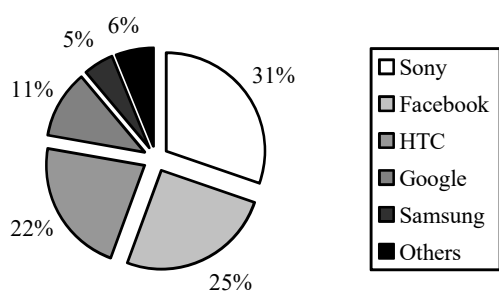


Figure 2. Usability of VR by companies

III. CONCLUSIONS

To sum up: expensive equipment and its maintenance, consumer dissatisfaction with the ergonomics of modern virtual machines designed and mixed reality, high risks of use and lack of solutions to ensure safe operation and the ability to improve the quality of output systems, lead to the fact that the VAMR industry is not yet mass and public.

In spite of the investment attractiveness and the considerable potential for growth, it is necessary to introduce such solutions that would overcome the above problems from the user's point of view and make a technological breakthrough to make VAMR technologies a part of everyday life.

Such a goal is achievable if a multidimensional consideration of the problems of the industry is not only from the point of view of the investor and the consumer, but also of the developer.

Here are several options to solve one of the problems:

- using augmented reality technology in a mobile-oriented university learning environment:
 - expand the capabilities of the laboratory facilities used to prepare students to work with real systems;
 - make available systems of high complexity and cost that were traditionally available only to specialists;
 - provides laboratory simulators with augmented reality interfaces that help to improve training;
 - motivates students to experiment and study.

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