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**IMPACT ON CONSUMER BEHAVIOR THROUGH VR\AR  
EXPERIENCE GAMIFICATION**

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**Abstract**

The development of VR\AR technology over the past 10 years has dramatically changed the landscape of many markets, including the advertising market. The rapid development and penetration of various VR/\AR tools in different areas are transforming the consumer experience, creating additional conditions for the introduction of game mechanics and gamification of the process of choosing, evaluating and buying various goods and services. The social, cultural, and communication sides of this process are still poorly understood; in particular, the relationship between gamification and VR\AR experiences in modern marketing must be traced to understand the impact of this technology on consumer behavior. Moreover, the scale of different advertising markets creates difficulties in assessing the penetration and interaction of VR\AR technology with consumers in developed and emerging markets. This paper attempts to systematize and evaluate the mutual influence of gamer experience and VR\AR experience for the demographic most susceptible to marketing suggestion - young people and girls aged 16-20. The results of this survey conducted in Russia are compared with the results of major marketing studies done in the American market in order to compare and examine their similarities and differences. The results of this analysis provide the basis for conclusions about the influence of gamer experience and gamer community involvement on the perception of VR\AR promotion in advertising materials.

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## 1. Introduction

Virtual reality (VR) - according to the commonly accepted definition, is a world created by technical means, transmitted to humans through their senses: vision, hearing, touch. Augmented reality (AR) is limited to the insertion of visual data into the human visual field in order to add information about the environment and change the perception of the environment. Thus, VR creates a new artificial world, while AR only supplements the existing one. This is the key difference between the two complementary technologies.

VR/AR technologies are the key to a fundamentally new level of human interaction with the digital environment, which plays an increasing role in the global economy, politics, and social relations. Virtual presentation of goods and services is an effective way to attract a potential consumer, to interest him, to demonstrate the consumer qualities of the product (maybe even only its prototype so far), to convey impressions of the product, and even to conduct virtual testing. Currently, AR/VR technologies are already used in industries such as healthcare, education, culture, tourism, industry, energy, logistics, transport, construction, HR, retail, e-commerce, entertainment, media and other consumer services.

The development of immersive technologies in marketing and advertising is undergoing major changes due to the trend towards the use of VR\AR technologies. The digital era affects the very basis of marketing principles, shifting advertising to a close interaction between the company and the consumer, building interactive communications between them. In 2020, the multi-experience trend based on VR/AR technologies topped Gartner's Strategic Trends 2020 ranking (Costello & Rimol, 2019). The current volume of the global immersive technology market, which includes virtual and augmented reality technologies, including those presented as apps on mobile devices, is about \$6.3 billion, with VR technologies accounting for half of that volume. The widespread adoption of VR/AR devices in the coming years will lead to exponential market growth - the total value of the market is projected to be about \$160 billion by 2023 (Statista, 2020).

## 2. Problem Statement

The development of augmented reality technologies (XR-technologies) can be traced since the 80s of the 20th century, and if at the beginning of its path this type of technology was seen only as a supplement to the industrial and design solutions in the IT-environment, then in the early 10s of the 21st century we can already note the trend to study changes in consumer behavior under the influence of the VR technologies in the tools of marketing and advertising complex (Alcañiz et al., 2019). Now, VR/AR-technologies have received the most profound development and widespread popularity in the entertainment markets and in marketing communications. The emergence and development in the near future of high-speed data transmission over 5G wireless networks will further spur the penetration of AR/VR-technology in the daily life of the consumer, there will be wearable autonomous devices that are affordable for mass use. The advertising market, in turn, will not be able or willing to stay away. Some companies are already actively using AR/VR technologies to promote their products or services, for example, by bringing the process of classic shopping into a virtual environment (Tsuichiya, 2018). One can conclude about the transformation of the consumer experience, in which an element of entertainment and "amusement" is

implanted, even in the process of buying or choosing a product or service. Fundamental work on the topic of consumer inclusion in the VR\AR experience through the provision of gaming elements within the formal processes of selecting, evaluating and purchasing a product or service was examined in 2016 by British researcher Stuart Barnes. In his work, the spread and active inclusion of VR\AR technologies in marketing communications is associated with the growth in the number of gamers, as well as the gradual cheapening of production and implementation of technology in the standard value chains of large brands (Barnes, 2016). This conclusion is fully consistent with the ideas of diffusion of innovation by Everett Rogers, as it can be noted that more and more small and medium enterprises in developed economies are incorporating VR\AR elements into their marketing communications, which corresponds to the gradual diffusion of these devices in private households.

Considering the key properties of VR/AR-technologies, primarily providing an opportunity to create another world around a person and to integrate gamification into the formal processes of searching and choosing goods and services, we can consider the following tasks of these technologies in the field of advertising and marketing:

1. Demonstration of an existing product or service. Elements of augmented reality are placed directly in the browser, where the usual content (text, photos, video, audio) is supplemented by optional information that can be read by an AR device. For example, to display a three-dimensional model of a piece of furniture in the interior. It does not matter whether the browser is opened from a desktop computer or from a mobile device or tablet. Apple's ARKit2 package of AR tools for developers with Quick Look helps implement this functionality. Offline stores can display products in real storefronts, and customers will receive additional information, such as the cost of clothing items and the composition of fabrics, by looking at the storefront through an AR device. Many large companies are already adopting a similar approach, integrating gaming elements into furniture selection (IKEA) or creating travel itineraries (3DVista).

The development of AR and VR technologies over time leads to a change in the approach to the physical retail space. Numerous shopping malls may become unnecessary. They will be replaced by virtual sites - marketplaces, where there will be a variety of products and services of different brands available through VR. Instead of renting a large retail space, it will be possible to rent small outlets in various shopping malls. It will be enough to demonstrate real samples of materials, and the rest of the buying process will be accomplished through digital format. Such an approach can become both attractive for customers and help reduce costs of sales fulfillment for manufacturing companies.

Using VR technology, it is possible to demonstrate rooms, such as an apartment or office space, to the consumer. No need to be physically on site to walk through the premises and choose the right one to buy or rent. In the same way, one can choose a car, demonstrate the work of a landscaper or builders. Sometimes VR is simply indispensable for presentations at exhibitions, when the exhibit is very large and it is physically time-consuming and financially expensive to demonstrate, such as a hydroelectric turbine, an airplane, a ship, a building, and the like.

2. Events facilitation. With the help of AR-technology it is possible to make presentations, exhibitions and other similar events more comfortable and interesting. For example, the user will only need to point the smartphone camera to a billboard or object of interest to find out the detailed information, the

start and end time of the event, the route or the buffet menu. Also AR will be perfectly suitable for facilitating shopping navigation and as a result will make the "customer journey" more comfortable.

Conducting presentations and exhibitions can be completely transferred into a digital environment with the help of VR-technologies. This has become especially relevant during the COVID-19 pandemic in 2020. Mass events will not soon resume without any restrictions on the number of participants or the social distance between them. And the human fear of getting sick is still present. Perhaps "like before" will never be again. Being in the comfort of one's own home, with the help of VR-technology it will be possible to be at the event of interest at almost any time. The advantages of this way of attending mass events include a 360-degree view from anywhere in the venue and all the functions of augmented reality.

3. Complementing the classic advertising media. Any offline object can easily become a link to some content in the digital environment. In the short term, this is another major segment of the outdoor advertising market. But when working in this segment there will be a need to pay more attention to security: if the fraudsters replace the tags with the ones they need, the user might be sent to a phishing site and lose money or his/her personal data. Tagging sites should thus be inaccessible to hackers.

Billboards, banners, posters, printed media pages, invitation cards, coupons, souvenir products (mugs, postcards, key chains, prints on clothing and accessories, etc.), if they have AR tags, can also become a guide to the world of augmented reality, adding elements of additional visualization, gamification and interest of the consumer. AR makes it possible to make any package digital. It is now possible to supplement information about your product with anything - a video, an animated character, or a game.

4. Exploring the consumer's user experience. By putting the consumer in a virtual store where they can move around, look at shelves of products, choose products, and perform tasks such as finding a certain product and answering questions such as "Did you notice the promotional materials?", marketers can gain invaluable experience. It will become possible to track, test and analyze different patterns of customer behavior and their interaction with products and promotional materials. Virtual reality allows you to change the conditions of the experiment in real time with minimal cost.

5. Product testing. With the help of VR/AR-technology in conjunction with other existing methods it is possible to test a new product or an updated version of an already known product. Based on the results of testing, based on feedback and results, it will be possible to refine the design, to draw conclusions about what needs to be corrected. Research proves that AR/VR testing participants understand what is required of them and give the same depth of evaluation and feedback as in the case of traditional offline testing with real samples (Farakhutdinov, 2019).

### **3. Research Questions**

It can be noted that all five of VR\AR's core application areas include gamification elements for the consumer experience, transforming the experience of a product, site or service by incorporating mechanics familiar to many gamers around the world: point-and-click mechanics, modified by pointing to certain design elements or searching for "hidden" information to obtain additional bonuses and discounts, search-and-explore, expressed by searching for various elements and exploring possibilities within the game space, customization, familiar to many fans of the Sims series line of games, and collectibles, which means collecting a certain number of objects within the game space, allowing for additional achievements. In

addition, the VR\AR content market itself is strongly tied to gaming and the market serving PC and video games: the revenue of the global VR gamer market was estimated at \$22.9 billion for 2020, and the video game segment is currently considered the largest in terms of investment in VR technology (Petrov, 2020). The intersection of the gaming and VR\AR sectors is also demonstrated by statistics on the use of these technologies in developed countries (USA and UK): the majority of consumers expressing interest in purchasing and using these technologies are men aged 16-35 with high income (Young, 2016), which correlates well with the current video gaming segment in the same developed countries. The increasing spread of video games as media is transforming the consumer experience through the use of video game mechanics in marketing, and VR\AR technologies are an ideal tool for such a transformation.

#### **4. Purpose of the Study**

The purpose of this research is to explore the relationship between the gamer experience of the modern consumer in Russia and the United States and awareness of VR\AR technologies within the demographic most interesting in this matter - young men and women aged 16-20. It is this demographic that interacts most closely with the modern gaming environment (not only the consumption of video game products, but also cybersports, streaming, and the blogosphere), as well as with the media that cover the issues of digital technology.

#### **5. Research Methods**

To examine the specifics of the impact of VR\AR-technologies on the consumer market in developed and developing countries, a study was conducted in the Russian market. The design of this sociological research was based on the methodology of research presented by Nielsen in 2017 regarding trends in the video game market and by YouGov in 2019 regarding the VR market. The combined methodological basis of these two studies made it possible to compile a questionnaire for members of the 16-35 generation, which is the main consumer of both video game and VR\AR content in Russia. The Millennial generation is the main consumer of video games both in the United States (Nielsen Company, 2017) and in Russia (Higher School of Economics, 2020), but it should be noted that video game culture itself came to Russia a little later, which is due to the specifics of the country's economic development in the period preceding and accompanying the collapse of the USSR (1985-1994). Thus, in the Russian video game landscape, we can observe less involvement of the older generation in the sphere of video games, because their preferences were influenced by the widespread development of Internet cafes in the early 2000s, which predetermined further preferences in the field of gaming (Higher School of Economics, 2020).

Also, the level of income has a significant impact on the study of VR\AR-technology preferences. Most VR\AR devices remain quite expensive for most consumers, even though there is a trend toward making them cheaper in the market. Moreover, even in the area of gaming in Russia, the vast majority of consumers have above-average incomes (Higher School of Economics, 2020), while in the American market the income level of the population allows gamers to buy multiple consoles or to own multiple devices that allow them to play video or mobile games (Nielsen Company, 2017).

The first stage of the study involved the examination of the lower demographic section of the range under study. The survey included 400 respondents aged 16-20, most of whom (60%) were men and women aged 17 years. Among the questions on the questionnaire that respondents were asked to complete were the following:

1. Mark the statements with which you agree:

- I am perfectly familiar with the concept of "virtual reality."
- I understand the difference between virtual reality and augmented reality.
- I have heard of the concept of "virtual reality," but I have superficial knowledge of it.
- I do not understand the difference between virtual reality and augmented reality.
- I believe virtual reality is the future.

2. On what platforms do you play games:

- On a computer.
- On a console.
- Smartphone.
- I don't play games.

3. Have you ever used a VR headset while playing a game? Describe your experience:

- I enjoyed it very much.
- It was unusual.
- I couldn't last more than 10-15 minutes.
- Had a headache after the game.
- My eyes were watery after the game.
- I felt nauseous after the game.
- I never used a VR headset during the game.

4. Which of the following VR gadgets do you own?

- VR gaming helmet.
- VR gadget for smartphones.
- A camera for making VR videos.
- I don't have a VR gadget.

5. Which of the following VR-gadgets would you like to buy?

- VR gaming helmet.
- VR gadget for a smartphone.
- A camera for making VR videos.

- None of the above.

6. How much money are you willing to spend on a VR device?

- 1 000 rub - 2 000 rub (\$13.5 - \$27).
- 2 500 rub – 3 500 rub (\$33 - \$47).
- 4 000 rub – 5 000 rub (\$54 - \$67.5).
- More than 5 000 rub (more than \$67.5).
- Not prepared to spend money on such devices.

## 6. Findings

According to the survey results, as expected, the majority of respondents (51%) are perfectly familiar with the concept of "virtual reality" and understand the difference between virtual reality and augmented reality. A superficial knowledge of virtual reality was demonstrated by 26% of respondents, and less than 10% did not know the difference between VR and AR at all. It can be noted that this result correlates with a similar survey for American consumers - high awareness was shown by 41% of respondents, superficial knowledge of the technology by 51%, and lack of knowledge by only 8% of respondents (Hiebert, 2019). We can see greater awareness in technical aspects among the younger demographic of Russian respondents, which further confirms the hypothesis of a dense connection between VR\AR technologies and the gamer experience - the younger generations around the world are much more heavily involved in the gamer environment not only through their own gaming experience, but also through the many streaming platforms (YouTube, Twitch, Mixer) that showcase letsplays, not to mention the many memes and discussions related to the video game industry. This reasoning is supported by further survey results regarding direct use of VR devices. The majority of respondents (60%) had never used a VR headset while gaming, but those who had (21%) reported a high degree of satisfaction with their experience. Among respondents who had used VR devices, a small number (2.63%) complained of headaches after using a virtual reality helmet, as well as watery eyes. Some of those surveyed (21%) tried watching movies in VR glasses, but did not last more than 10-15 minutes because of the intense strain on their eyes. In this case, we can also observe a correspondence to the American market - in the U.S. market about 19% of users have used VR technology in 2020, while the number of satisfied with this experience is much higher (55%) (AR Insider, 2020), which is due to adjustment for the number of respondents who have had some kind of experience in VR-environment - in Russia there are significantly fewer (41.5% of respondents) than in the United States, where such devices are much more affordable.

This is confirmed by the fact that the majority of respondents (78%) admitted that they do not have any VR-gadgets because of the high cost. Of these 230 people (60%) would like to buy a VR gaming helmet, the rest dream of a VR camera (10%) and a VR gadget for a smartphone. It can be noted that about the same percentage of respondents (75%) have some kind of gamer experience: either on a personal computer (27.5%), consoles (15%) or mobile devices (32.5%). The coincidence of these figures once again points to the tight correlation between video game experiences and interest in VR technology, which is also noted in the Nielsen study.

The survey showed that respondents are not willing to pay more than 5,000 rubles (\$67.5) for VR gadgets. Given the average price of gadgets of this type in Russia (PlayStation VR helmet - \$300, Oculus Rift VR-glasses - \$500), such a distribution seems quite logical. In the American market, the proportion of respondents who note the high price of the devices is somewhat lower (43%), with lack of interest (53%) being among the arguments that respondents cite as justification for not buying a VR gadget (Richter, 2017). In this case, we can consider the issue of further study - the mix of different demographic groups in this case has a strong influence on the research results: as it was mentioned earlier, even in the American market, where VR technologies are much better developed than in Russia, respondents of high demographic profile are much less involved in the gaming environment, which entails the expression of less interest in this type of technology.

Rather paradoxical, at first glance, is the fact that many respondents (57%) have never heard of such a concept as "mobile augmented reality". At the same time, during the additional discussion on the results of the survey, it was revealed that the respondents are not only aware but also actively use AR applications. The most popular among the respondents was the Layer application, which allows scanning the menu in a restaurant, groceries in a store, etc. Among other popular applications were Ink Hunter (an application that uses AR to select and apply tattoos through computer vision technology) and Artefact (AR guide to Russian museums and art galleries). In this case, it is interesting that despite the fairly widespread use of the technology itself, the demographic segment under study does not know the name of the technology itself, because in the Russian media field the term VR is used much more often than AR. According to Google Trends statistics, the popularity of the query "VR" versus "AR" is on average 59:31 in favor of VR for Russian web searches, while the same ratio is 20:86 in favor of AR for American searches. This gap can be explained by the fact that Russian consumers are aware of VR technologies mainly through video game advertising by major brands (Sony, Oculus, HTC), major streamers and bloggers, and video game exhibitions, while AR technologies are covered much less because they are not as intricately connected to the video game community. This once again confirms the interpenetration and symbiotic development of the segments of video games and virtual and augmented reality technologies.

This conclusion is also confirmed by the fact that many respondents use AR technologies in education. For example, 170 out of 400 respondents shared that they used augmented reality while visiting museums. Part of the respondents (37%) at least once asked for help from an AR application during their studies, but, as mentioned earlier, did not know the official name of the technology itself, which they used. We can see a very interesting trend - the applied specifics of AR-technology, its isolation from the gamer environment does not allow the current generation of young people from Russia aged 16-23 years to consider this technology as something unique and unusual. It is perceived as an organic part of everyday life, while VR-gadgets act as something like a "treasure chest", which is a welcome acquisition for many members of this generation, but inaccessible because of its high cost.

The reflection of this thesis can also be seen in the fact that not a single respondent considers VR/AR technology as a means of making our lives easier. Also, no one agreed with the judgment that virtual reality is the future, which confirms the above judgment that VR technologies are not considered by this demographic as something necessary and effective for everyday life.

## 7. Conclusion

The conducted research revealed several important aspects of the relationship between gamer experience and VR\AR technologies in the 16-20 year demographic in the Russian market compared to the U.S. market. First, the general trends of the gamer environment's relationship with the spread and influence of VR/AR technologies on the customer experience persist in both markets - most interactions of this demographic with VR take place within the framework of recognition or awareness through the gamer community, including streaming services, while AR technologies are perceived mostly as a convenient utilitarian addition to everyday services, including educational ones. Second, the main problems with VR technologies lie in the area of expensive gadgets on the market, while the availability of AR technologies is taken for granted. A certain degree of sacralization of VR gadgets, their transformation into a luxury item through the same gamer blogosphere forms a desire to buy in the studied demographic, but the high cost does not allow them to realize this desire, making them potential consumers of the technology in the future, when prices for such devices become lower, which is the inevitable development of any high-tech consumer market. Finally, it may be noted that the above trends persist for both the Russian and American markets, but American consumers have entered the gaming market 10-15 years earlier than Russian consumers, which has already formed a sufficient number of consumers with solvent demand in the VR\AR-gadgets sector, while in the Russian market this process is still ongoing and will end, given the above-mentioned time gap, when the current generation of 20-year-olds will start to earn enough money to afford the desired "expensive toy".

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