

Strategy for Effective Production of Advertising Using Virtual Reality Technology

Seung-Yeob Yu

Dept. of Advertising and Public Relations, Namseoul University 91, Daehak-ro, Seonghwan-eup,
Seobuk-gu, Cheonan-si, Chungnam, 31020, Korea

ysyeob@hanmail.net¹

Corresponding author^{*} : Phone: +82-010-3291-2232

Article Info

Volume 81

Page Number: 502 - 515

Publication Issue:

November-December 2019

Abstract

Background/Objectives: This study examines the effects of VR advertising attributes on advertising effectiveness. We examined whether the VR advertising attention affects consumer innovativeness, and also confirmed the mediating effect of consumer innovation by confirming the effect of consumer innovation on VR advertising attitude.

Methods/Statistical analysis: Participants of this study recruited subjects to experience VR advertisements from October to November 2018 at universities in three cities of Korea. VR box 2.0 was used as the VR equipment, and the same high-definition mobile phone and earphone were installed. Exploratory factor analysis and confirmatory factor analysis were conducted to confirm the validity of the scales used in this study. Cronbach's alpha coefficients were used to determine the reliability of the scales used in the study. Covariate structure analysis was performed to verify the hypothesis.

Findings: First, as a result of verifying the influence of VR advertisement attributes on advertisement attention, the novelty of VR advertisement attributes had a significant positive effect on advertisement attention. In addition, the dynamics among VR advertising attributes have a significant positive effect on advertisement attention. It had a significant positive effect on the attention of stereoscopic(three-dimensional) attribute advertising among VR advertising attributes. However, the reality of VR advertising attributes had a significant negative effect on advertisement attention. In conclusion, all the VR advertisement attributes set in this study were found to have a significant effect on advertiser goal. Third, in the causal relationship between advertising attention and VR advertising attitude, we verified whether consumer innovation has a mediating effect. The results show that consumer innovation characteristics have a mediating effect on VR advertising attitudes.

Improvements/Applications: This suggests that the importance of VR advertising attributes to the advertising planners who want to produce VR advertising. This study is valuable in attempting to verify the advertising effect through the empirical research method for the activation of VR advertising.

Keywords: VR, Virtual Reality, VR Technology, VR Advertising, VR Advertising Production

Article History

Article Received: 3 January 2019

Revised: 25 March 2019

Accepted: 28 July 2019

Publication: 22 November 2019

1. Introduction

Recently, the biggest issue in each field is the new ICT (Information and Communication Technology) industry through convergence. The most popular technology is Virtual Reality (VR). The term virtual reality (VR) was first conceived in Jaron Lanier's work[1], and the user created a virtual environment called VR through head-mounted goggles, allowing the user to experience a spatial and temporal experience that is similar to reality[2]. In addition, VR refers to an environment in which users can experience tele-presence in real time through a virtual world, and it is very important to increase their immersion and interactivity [3, 4].

The current VR-related industries are rapidly popularizing the VR market with the increase in the number of users of VR products, mainly focusing on the supply of HMD (Head Mounted Display) of domestic and foreign ICT companies[5]. Recently, rapid development of related media technology and investment in government VR contents development have been influencing consumers to accept new products [6].

According to ZDNet's research, the global VR device market is expected to reach 14 million by 2020 from 14 million this year [7]. According to Statista data, the VR market worldwide will surpass 100 million in 2018, bringing the total number of users to 170 million, suggesting that the virtual reality market will become popular[8].

In particular, the technology related to VR stimulates the five senses of the user and is useful for easily adapting to the virtual environment by detecting a viewpoint or motion change similar to the real world [9].

These features will have a positive impact on the marketing and service experience and brand attitude of the company and will be a driving force in the advertising strategy using digital media. For example, Facebook bought the VR company Oculus at a cost of \$ 200 billion based on the forecast of the VR market. At the Mobile World Congress 2016 (MWC) in 2016, it appeared at Samsung's unpacked event, demonstrating the VR and marketing industry's prospects to the public through the speech, "Virtual Reality (VR) is the next generation social platform." In addition, Google, LG Electronics, and Sony are also paying attention to the value of VR technology utilization [10].

As such, VR technology is expected to grow steadily as global companies are actively utilizing new products or enhancing brand experiences among consumers [8]. Furthermore, as it is used to produce content that combines advertising and entertainment, VR technology is in the spotlight as a successful marketing example of companies such as BMW and Coca-Cola. Also, the long-standing concern of companies and advertisers is how to deliver their messages to consumers and how to remember them for a long time. To solve this problem, advertisers believe that VR-based advertising will play an important role as a new advertising medium.

Therefore, in order to further grow the VR advertising market, it is necessary to understand the theoretical and practical performance in an integrated manner. However, VR advertising is still focused on practical performance based on technology, and most of the technical analysis is based on specific cases. Therefore, it is necessary to

newly define the features and concepts of the technology-based advertisement in the VR, and to verify the influence on the advertisement effect.

In addition, previous researches related to VR advertising mainly verified the effect of advertising on respondents who had experience or knowledge of VR equipment in advance. Therefore, this study aims to empirically verify the causal relationship between VR advertising characteristics and advertising effects by directly experiencing VR advertising rather than verifying the effects of VR technology. Specifically, this study examines the effects of VR advertising attributes on advertising effectiveness based on the results of Choi, and Yu[11]. In addition, we investigate the effect of audience factors on VR advertising effectiveness. In order to do this, we examined whether the VR advertising attention affects consumer innovativeness, and also confirmed the mediating effect of consumer innovation by confirming the effect of consumer innovation on VR advertising attitude [12]. This suggests that the importance of VR advertising attributes to the advertising planners who want to produce VR advertising in the future is expected to provide a basis for the market segmentation data of VR advertising.

2. Theoretical background

2.1 VR advertising characteristics

The characteristics of VR advertising include all the experiential elements of cognition and emotion perceived when the audience provides a realistic product and brand experience in a virtual environment. First, the representative feature that appears in the study of existing VR is the presence feature. Presence refers to the degree, involvement, and immersion in a

certain virtual space as if it were present [13]. This enhances the interaction effect between the audience and the virtual reality through the mediated virtual environment, and further blurs the boundaries of the indirect experience, making the product or brand experience in the video feel closer. In addition, VR advertisements provide an environment with real-time interaction, allowing audiences to experience 360-degree video in unlimited time and space. For example, Hyundai Motors, through the VR advertisement of the new car "Ionic", has experienced the product in a multi-sensory way as if it were a real vehicle from the outside to the inside of the vehicle [14]. In this way, unlike the traditional media, VR advertising allows consumers to actively control and handle advertising at the moment of viewing the advertisement, and maximize the shopping experience. In other words, how realistic the consumer feels virtual reality and actively engages in advertising can help increase brand satisfaction and purchase [12]. Therefore, this study assumed that how realistic the users feel and how they behave dynamically from the perspective of presence affects the advertising effectiveness process.

In addition, high quality visual image is essential to facilitate the interaction of the virtual environment in order to enhance the presence characteristics of the contents [15]. Among them, producing a sense of five senses through advertisement contents by enhancing three-dimensionality and realizing a three-dimensional virtual reality world can increase the immersion and interest of the audience [16].

Steuer [3] said that the three-dimensional effect in message delivery through VR increases the richness of sensory expression

and is important for expressing images in a natural and three-dimensional way as if it were real. It is important to realize realistically and clearly so that the experience that can be acquired through visual expression is closer to the direct experience of the user. Therefore, this study assumes that the three-dimensional implementation of VR advertising will affect the advertising effect process.

Also, advertising generally has a marketing purpose to promote a specific product or brand. However, unlike the information-type advertising type, VR advertising delivers the message around fun and entertainment elements. For this reason, VR advertising mainly uses entertainment mechanisms to expose products or brands naturally [17]. In other words, it is important for VR advertising to provide a pleasant experience through virtual reality and to bring positive responses through consumer's immersion and realism. Therefore, this study judged that the entertainment factor of VR advertising will be an important component in understanding the characteristics of VR advertising.

2.2 VR Advertising Effect Study

VR advertising is a new type of advertising that is fused with new technology. These types of ads are important to understand the psychological state of consumers who want to accept new advertisements [18]. VR advertising is based on the active involvement of consumers. In other words, consumers with low innovativeness dislike change and feel VR advertising as a threat, while high-innovation consumers are aggressively trying to experience advertising [19]. Therefore, in order to understand the influence of VR advertising on the advertising effect process, it is necessary to first understand what attitude

the user has to new information such as VR advertisement. To examine the existing research, we use self-efficacy, consumer innovativeness, and cognitive desire as the mediating variable to test the related personal characteristics between new media advertisements and users [16, 19]. The purpose of this study is to investigate the mediating effects of innovativeness of consumers on the acceptance of VR advertising.

In addition, it has long been studied whether the attitude toward advertising affects consumers' attitude toward advertising. The results of this study are as follows. First, the advertising attitude is used to comprehensively test the effects on the cognitive, emotional, and behavioral aspects of advertisements with a preference tendency that is consistently favorable or unsubstantiated for an object [5]. It is also an important factor in identifying the marketing performance by examining the attitudes of the consumers and verifying the overall responses of the consumers. Therefore, this study will be helpful to understand the process of advertising effect by verifying the influence of VR advertising characteristics on advertisement attention. The purpose of this study is to investigate the effect of VR advertising attributes on VR advertising attention based on the preceding studies. Also, we tried to utilize it to market segmentation by confirming the mediating effect of consumer innovation. The following hypotheses were established to achieve the purpose of this study(see Figure 1).

Hypothesis 1-1: The novelty attribute of VR ads will have a positive (+) effect on advertising attention.

Hypothesis 1-2: The dynamics attribute of

VR advertising will have a positive (+) effect on ad attention.

Hypothesis 1-3: The reality attribute of VR advertising will have a negative (-) effect on advertising attention.

Hypothesis 1-4: The stereoscopic attribute effect of VR ads will have a positive (+) effect on ad attention.

Hypothesis 2: Attention to VR advertising will have a positive (+) effect on consumer innovation.

Hypothesis 3: Consumer innovation will have a positive (+) effect on VR advertising attitude.

Hypothesis 4: Attention of VR ads will have a positive (+) effect on VR advertising attitude.

Hypothesis 5: The attitude of VR advertising will affect the attitude of advertising through mediating consumer innovation.

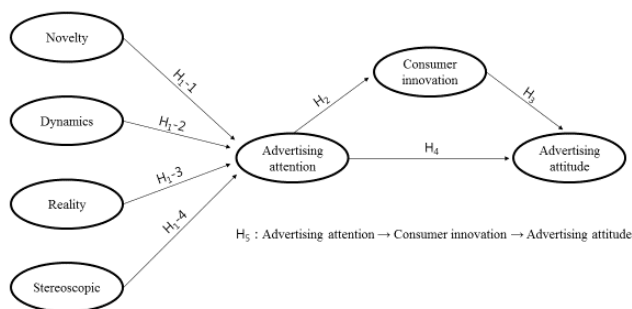


Figure 1. Research model

3. Method

3.1 HMD equipment and VR advertisement selection

Participants of this study recruited subjects to experience VR advertisements from October to November 2018 at universities in three cities of Korea. VR box 2.0 was used as the VR equipment (see Figure 2), and the same high-definition mobile phone and earphone were installed. The VR advertisements selected for the respondents' experience are

actual on-air overseas advertisements filmed with a VR 360 degree camera. In this experiment, a total of 6 titles were selected for commercial story and content experience (movie advertisement, animal development game advertisement, sportswear advertisement, dental advertisement, tea bag advertisement, automobile advertisement).



Figure 2. Used VR BOX in research

3.2 Data Collection and Respondent Characteristics

In this study, we collected the data through the self-filling questionnaire after experiencing the above selected VR advertisement. VR experience time was 10-15 minutes on average, and in the individual VR experience space, mentors explained how to use the device and helped wear the HMD. Students who were wearing glasses and had limited experience or dizziness were selected and removed from the data. As a result, a total of 306 data were analyzed except for the insincere response. The gender distribution of the respondents was 137 (44.8%) for male students and 169 (55.2%) for female students. The age distribution ranged from 18 to 27 years. I have experienced VR related video at least once or less than 3 times. These results indicate that the level of knowledge or experience related to the VR of the respondents is evenly distributed.

3.3 Measurement scale

3.3.1 Novelty

Novelty attribute in VR advertising is the pleasant mood, the emotion of interest, which is manifested in the emotional characteristics by the stimulus that makes the audience feel good. It's like having fun and having a pleasant emotional response through a web-based content experience. Therefore, this study intends to measure novelty attributes to explain the emotional characteristics of VR advertising. The items in the measurement scale will measure factors for novelty based on previous studies by McGloin, Farrar, & Krcmar [20].

The questions about the novelty attribute of VR advertisements are as follows. VR advertising was interesting to me., "VR advertising gave me fun.", "VR advertising was amazing and I was focused.", "VR ads are new to me because they're new content that doesn't exist." Four items were measured using the Likert 5-point scale. As a result of reliability analysis of novelty property, Cronbach ' α ' = .928.

3.3.2 Dynamics

An important feature of space and time in VR advertising is its dynamics. Dynamics means that the movement of objects in VR advertising is realistic and how vivid and natural it is. This phenomenon plays an important role in increasing the realism of the audience who sees the advertisement and forming a positive attitude across the boundaries of space and time. This study measures the factor of dynamics based on the work of Walther & shin [21].

The items for measuring the dynamics attribute are as follows. "I felt as though I had to move my body 360 degrees in the

VR commercial," "When I experienced the VR commercial, I felt like things would be touched." It felt dynamic.", "I felt a strong movement between objects in the VR commercial." , "When I experienced the VR commercial, I felt like manipulating the real thing. " Five items were measured using the Likert 5-point scale. As a result of reliability analysis of dynamic properties, Cronbach ' α ' = .902.

3.3.3 Reality

Reality is the most important feature of VR advertising. This is to perceive the existing state in the virtual environment implemented on the web. Depending on the reality of the virtual space, the degree of involvement and immersion in the user's message in VR can be greatly different. This study measured factors for reality based on previous studies by Coates [2] and Heim [4].

The following items measure the reality attributes of VR advertising. In VR advertising, I felt as if I was in a virtual space.", "In VR advertising, I felt as if it were real in a virtual space.", "In VR advertising, I felt like experiencing a different world (space). ", " In VR commercials, I feel like I'm connected to a virtual world. ", " In VR commercials, I feel like I'm moving in space. " Five items were measured using the Likert 5-point scale. As a result of reliability analysis of reality attribute, Cronbach ' α ' = .919.

3.3.4 Stereoscopic

One of the important factors in VR advertising is the stereoscopic factor. In the virtual environment, the shape of objects that are vivid and stereoscopic(three-

dimensional) is essential for realizing marketing effects by giving reality such as color, texture, and light of appearance [22]. Therefore, this study intends to measure the stereoscopic (three-dimensional) characteristics, which are the elements of the visual reality of VR advertising. The items of the measuring tool measured the factor of stereoscopic(three-dimensional) effect based on the study of Coates [2] and Steuer [3].

The measurement items for the stereoscopic(three-dimensional) properties of VR advertisements are as follows. In VR advertising, things are distinguished from the background.", "In VR advertising, I feel as though the objects are in my hand." , "I felt the three-dimensionality of the object in the VR commercial.", "I felt the perspective in the VR commercial." Five items were measured using the Likert 5-point scale. As a result of reliability analysis of stereoscopic(three-dimensional) properties, Cronbach ' $\alpha = .869$.

3.3.5 Consumer innovation

In this study, the consumer's attitude of innovation was considered as part of the individual's natural tendencies. It was viewed as the concept of inherent innovation possessed by an individual. Therefore, this study defined the concept of consumer innovation as 'Personal Innovativeness (PI)', which means the individual's intention to accept new information technology. In this study, factors were measured based on the research of Agarwal & Prasad [18].

The following items measure consumer innovation. I try new things in

doing something.", "I'm curious when I find something new, so I buy it." "I tend to try new things ahead of the people of the Lord.", "I follow the latest trends." Four items were measured using the Likert 5-point scale. As a result of the reliability analysis of consumer innovation, Cronbach ' $\alpha = .915$.

3.3.6 Advertising attention

In this study, to determine the effect of VR advertising attributes on advertisement attention, we selected VR advertisement attention as a dependent variable. VR advertising is a very new impetus for consumers. The perceived process of paying attention to the new stimulus was judged to be an important variable in determining the advertising effect. Therefore, this study first selected advertiser purpose as the effect concept for VR advertisement.

The following items measure the attention of VR advertisements. "I think VR advertising attracts attention", "I'm interested in VR advertising.", "I pay attention to VR advertising.", "I have a look at VR advertising". Four items were measured using the Likert 5-point scale. As a result of reliability analysis of VR advertisement attention, Cronbach ' $\alpha = .897$.

3.3.7 Advertising attitude

In order to verify the validity of the characteristics of VR advertisements, the advertisement attitude was selected as the dependent variable. In recent years, researchers have been interested in the emotional response of consumers to their advertising with the ability to diagnose important advertising effects. In particular,

the researcher found that Ad, which is an emotional composition representing consumer's feelings such as favorable / unfavorable response to the advertisement itself, is an important advertising effect variable [19]. Therefore, this study selected the attitude of advertisement as the concept of advertisement effect.

The questions that measure the attitude of VR advertising are as follows. "I am in favor of VR advertising, "I like VR advertising.", "I think VR advertising is positive.", "I'm impressed with VR advertising." Four items were measured using the Likert 5-point scale. As a result of reliability analysis of VR advertising attitude, Cronbach ' α ' = .958.

3.4 Data analysis

This study used SPSS / PC + Windows 21.0 program for statistical analysis. Frequency analysis was conducted to identify the characteristics of participants. In addition, exploratory factor analysis and confirmatory factor analysis were conducted to confirm the validity of the scales used in this study. Cronbach's alpha coefficients were used to determine the reliability of the scales used in the study. In order to verify the research model, we analyzed the covariance structure using AMOS 21.0.

4. Result

4.1 Factor analysis and reliability analysis

First, exploratory factor analysis was performed to identify the factor structure of the 23 items used in the study. As a result, KMO was high at .907 (significance level above .6), and Bartlett's spherical test results showed that $\chi^2 = 5980.741$ (df = 253, $p < .001$). According to the factor analysis, four factors were derived according to the criterion with the eigenvalue of 1 or more and explained 72.47% of the total variance. Factor 1 was named as novelty, and 8 items (Eigen Value = 10.05) were formed. Factor 2 was dynamically named and consisted of 5 items (Eigen Value = 3.76). Factor 3 was named reality and consisted of 5 items (Eigen Value = 1.83). Factor 4 was named stereoscopic and consisted of 5 items (1.02) (see table 1). The results of the reliability analysis of the extracted scale are as follows. Novelty: Cronbach's α = .902, Dynamics: Cronbach's α = .919, Reality: Cronbach's α = .919, Three-dimensional: Cronbach's α = .869, Consumer innovation: Cronbach's α = .915, Advertisement Attention: Cronbach's α = .897, Advertising attitude: Cronbach's α = .958. These results were more than Cronbach α of 0.7, confirming that there was no problem in the reliability of all the scales used in the study(see table 2 and Figure 3).

Table 1: Validity and Reliability of Measured Variables

Item	Factor 1	Factor 2	Factor 3	Factor 4	Communality	Cronbach α
Item 21	.843				.773	
Item 18	.840				.828	
Item 19	.820.				.835	
Item 20	.792				.678	

Item 17	.757				.778	.928
Item 16	.752				.724	
Item 22	.741				.606	
Item 23	.722				.625	
Item 15		.813			.765	
Item 12		.788			.783	
Item 14		.745			.724	.902
Item 11		.738			.600	
Item 13		.720			.746	
Item 9			.730		.777	
Item 8			.722		.764	
Item 7			.720		.821	.919
Item 6			.696		.688	
Item 10			.558		.579	
Item 1				.800	.669	
Item 4				.786	.774	
Item 5				.775	.685	.869
Item 3				.603	.719	
Item 2				.690	.727	
Eigen value	10.052	3.760	1.832	1.024		
% of Variance	43.705	16.346	7.965	4.453		
Cumulative %	43.705	60.051	68.015	72.468		

Table 2: Reliability Test

Scale	Number of items	Cronbach α
Consumer innovation scale	4	.915
Advertising attention scale	4	.897
Advertising attitude scale	4	.958

4.2 Confirmatory factor analysis

This study conducted confirmatory factor analysis to confirm the validity of the factor structure of VR advertising attributes. Three items were deleted for the model fit. A total of 20 items showed an appropriate factor structure and the model fit was also satisfactory overall ($\chi^2 (137) = 1031.764$, $p < .000$, $RMR = .060$, $GFI = .826$, $AGFI = .782$, $NFI = .888$, $CFI = .925$, $TLI = .912$, $RMSEA = .067$). In addition, the mean variance extraction (AVE) and the conceptual reliability were all satisfied, and the threshold was satisfied for the fitness index. In this way, the fit of the model was

recognized and it was judged that there was no problem in analyzing the structural model.

4.3 Research Model and Hypothesis Testing

This study examined the research model before hypothesis testing. According to the results of the verification, $AGFI = .862$ among the fitness indexes of the study model did not satisfy the acceptance criteria. Therefore, this study improved the fit of the research model by removing three items from the model which were identified as the observation variable of measurement error with large modification index. The final model was derived from this

modification ($\chi^2 (137) = 1031.764, p < .000$, RMR = .060, GFI = .826, AGFI = .782, NFI = .888, CFI = .925, TLI = .912, RMSEA = .067).

The final analysis results and the hypothesis test results of the revised research model are shown in Table 3. The results of the revised research model according to the final research results are shown in Figure 3. As a result of the hypothesis 1, the path coefficient between the two variables on the influence of the novelty attribute of the VR advertisement on the advertising attention affects .337 ($t = 4.113, p < .001$). Hypothesis 1 was therefore accepted. As a result of the hypothesis 2, the path coefficient between the two variables on the influence of the dynamics of the VR ad on the ad attention affects was .232 ($t = 2.652, p < .01$). Hypothesis 2 was therefore accepted. As a result of hypothesis 3, the path coefficient between the two variables on the influence of the reality attribute of the VR advertisement on the advertising attention affects -.387 ($t = -3.770, p < .001$). Hypothesis 3 was therefore accepted. As a result of the hypothesis 4, the path coefficient between the two variables on the influence of the stereoscopic property of the

VR advertisement on the advertising attention affects 2.329 ($t = 7.064, p < .001$). Therefore, Hypothesis 4 was accepted. As a result of hypothesis 5, the path coefficient between the two variables on the influence of VR advertising attention on consumer innovativeness was .772 ($t = 9.268, p < .001$). Therefore, Hypothesis 5 was accepted.

According to result of hypothesis 6, the path coefficient between two variables on the effect of consumer innovation on ad attitude was .141 ($t = 3.354, p < .001$), which had a positive effect. Hypothesis 6 was therefore accepted. As a result of hypothesis 7, the path coefficient between two variables on the influence of VR advertisement attention on ad attitude was 1.268 ($t = 16.815, p < .001$). Therefore, Hypothesis 7 was accepted. As a result of analyzing the mediating effect of consumer innovativeness in the causal relationship between the attitude of VR advertisement of hypothesis 8 and ad attitude, the indirect path coefficient has a positive effect of 1.158 ($p < .001$). Therefore, Hypothesis 8 was confirmed to have a partial mediation effect (see table 3 and figure 3).

Table 3: Hypothesis testing Results

Channel			Estimate	S.E.	C.R.	p	Hypothesis
VR Advertising Attention	←	Novelty	.337	.082	4.113	***	H1-1, Accept
VR Advertising Attention	←	Dynamics	.232	.087	2.652	.008	H1-2, Accept
VR Advertising	←	Reality	-.387	.103	-3.770	***	H1-3, Accept

Attention							
VR Advertising Attention	←	Stereoscopic	2.329	.330	7.064	***	H1-4, Accept
Consumer Innovation	←	VR Advertising Attention	.772	.083	9.268	***	H2, Accept
VR Advertising Attitude	←	Consumer Innovation	.141	.042	3.354	***	H3, Accept
VR Advertising Attitude	←	VR Advertising Attention	1.268	.075	16.815	***	H4, Accept
VR Advertising Attitude ← Consumer Innovation ← VR Advertising Attention				1.158 ***		H5, Accept	

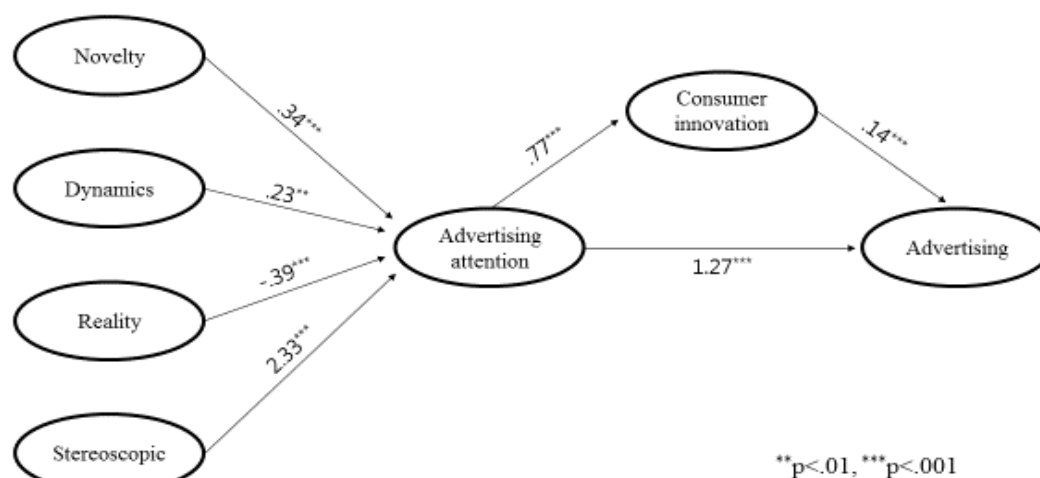


Figure 3. Final Research model

5. Conclusion and Discussion

This study confirmed whether VR advertising attributes affect advertiser's purpose and attitude. In addition, it was confirmed whether the characteristics of consumer innovation, which is an attribute of advertisement audience, influence the attitude of VR advertising. Based on these results, this study suggests a solution for VR advertising producers about what

advertising attributes should be considered in order to produce effective VR advertising. In addition, this paper proposes a solution to what consumer characteristics should be considered in order for VR advertising to be effectively delivered to consumers. The results of this study can be summarized as follows.

First, as a result of verifying the influence of VR advertisement attributes on

advertisement attention, the novelty of VR advertisement attributes had a significant positive effect on advertisement attention. In addition, the dynamics among VR advertising attributes have a significant positive effect on advertisement attention. It had a significant positive effect on the attention of stereoscopic (three-dimensional) attribute advertising among VR advertising attributes. However, the reality of VR advertising attributes had a significant negative effect on advertisement attention. In conclusion, all the VR advertisement attributes set in this study were found to have a significant effect on advertiser goal. These results provide practical implications for VR ad productions. In other words, in order to increase the attention to VR advertising, it is essential to present VR advertising to consumers as a very exciting stimulus inconsistent with existing beliefs. In addition, there is a need for a method of producing and presenting a VR advertisement so as to visually perceive it very dynamically. In addition, VR advertising needs to be presented to consumers as a highly stereoscopic stimulus. On the contrary, it is judged that presenting VR advertisements as a stimulus not seen in reality rather than feeling reality is essential for producing effective VR advertisements.

Second, it was verified whether the attention of VR advertisements influences the attitudes of advertisements. As a result, the higher the advertising attention, the more positive the VR advertising attitude was. This means that creating and executing VR advertisements for consumers can create a positive attitude toward advertising. Therefore, in order to produce effective VR advertisements, it is necessary to consider

production and execution methods that can attract VR advertisements to consumers.

Third, in the causal relationship between advertising attention and VR advertising attitude, we verified whether consumer innovation has a mediating effect. The results show that consumer innovation characteristics have a mediating effect on VR advertising attitudes. Therefore, this reflects the propensity of consumers to accept new advertising technology, suggesting the importance of advertising type integrating various technologies and marketing strategies. In addition, although previous studies related to innovation from marketing perspectives can be viewed as variables of products and informations [23], the increasing interest of consumers in the media suggests that a comprehensive understanding of new IT technologies and advertisements is needed. In conclusion, it is important to analyze not only advertising ideas but also consumers' media usage and media environment in VR advertising planning. In other words, it is important to understand the characteristics of media and establish a vivid and simple advertising creative strategy at the time when digital technology-based advertising appears quickly.

The implications of this study are as follows. While the VR-related advertising market is getting bigger and larger, empirical research on VR advertising is very lacking. In fact, research on the characteristics of advertisements and measuring the effectiveness of respondents who have experienced AR advertisements is difficult to find regardless of domestic and foreign. However, in the next few years, the popularity of VR devices will have a big

impact on the advertising industry, and more in-depth research needs to be conducted. Therefore, this study is valuable in attempting to verify the advertising effect through the empirical research method for the activation of VR advertising.

However, this study has limitations in not considering various dependent variables in analyzing the causal relationship of advertising effect of VR advertising characteristics. In addition, we could not consider the differences in the characteristics of VR advertisement types. Therefore, it is necessary to include various VR advertising types in the future research. The results of this study can suggest a way for the advertising industry to survive the demands and expectations of the new type of advertising as VR technology develops. It is also expected to contribute to ad research development through the presentation of new ideas and the use of new technologies.

6. Acknowledgments

Funding for this paper was provided by Namseoul University.

7. References

- [1] Jaron Lanier. Virtual reality; an interview with Appears In. Whole Earth Review. 1989 Fall; 64:108-130.
- [2] Coates, G. Program from Invisible Site—a virtual show, a multimedia performance work presented by George Coates Performance Works, San Francisco, CA. 1992.
- [3] Steuer, Jonathan. Defining Virtual Reality: Dimensions Determining Tele-presence. Journal of Communication. 1992; 42(4):73-93.
- [4] Heim, Michael. The Metaphysics of Virtual Reality. Oxford: Oxford University Press. 1993.
- [5] Yong Min Kwon. Virtual Reality SNS era opens in earnest... Killer content. Seoul Economy. 2017. [http:// www.sedaily. com/ News View /1ODA XW XRH3](http://www.sedaily.com/NewsView/1ODA XW XRH3).
- [6] Hee Suk Lee. A Study on the Factors Affecting the Intention of Using VR Games. Information Management. Yonsei University, Seoul. 2016.
- [7] Hee Jung Ahn. Virtual reality, explosion from 2016? Shipments forecast at 14 million units. ZDNet. 2015. <http://www.zdnet.co.kr/news/>.
- [8] Bu Yeun Jung. Virtual reality (VR) ecosystem status and implications. Information and communication broad-casting policy. 2016; 28:1-23.
- [9] H. S. Jun, M. G. Han, J. H. Jang. Application trends in virtual reality. Electronics and Telecommunications Trends. Korea Electronics and Telecommunications Research Institute. 2017; 32(1):93-101.
- [10] KT Economic Research Institute. Future Industry Forecasts Changed by Virtual Reality (VR). Operator Wyatt, Digi-Eco Report. 2016.
- [11] Y.S. Choi & S. Y. Yu. The Effect of VR Advertisement Characteristic Components on the Perceived Usefulness and Ease and Advertisement Attitude. International Journal of Innovative Technology and Exploring Engineering. 2019 January; 8(3C): 424-430.
- [12] C. H. Cho, H. j. Lee, H. H. Kim, S. Y. Lee, Y. H. Keel. Content Analysis of Digital Reality Contents as a Branded Entertainment. The Korean Journal of Advertising. 2018; 29(5):127-160.
- [13] Suh, K., & Lee, Y. The effect of virtual reality on consumer learning: An empirical investigation. MIS Quarterly. 2005; 29(4):673-697.
- [14] Kober, S. E., & Neuper, C. Personality and presence in virtual reality: Does their relationship depend on the used presence measure?. International Journal of Human-Computer Interaction. 2013; 29:13-25.
- [15] Forbes. Virtual Reality Will save Retail. 2016. www.forbes.com.

- [16] Nicovich, S., Boller, G., & Cornwell, B. Experienced presence within computer-mediated communications. *Journal of Computer-Mediated Communication*. 2005;10(2),JCMC1023.
- [17] Zhang, J. To play or not to play: An exploratory content analysis of branded entertainment in Facebook. *American Journal of Business*. 2010; 25(1):53-64.
- [18] Rogers. *Diffusion of Innovations*, 5th edition, New York: The Free Press. 2003.
- [19] Agarwal, R., & Karahanna, E. Time Files When You're Having Fun: Cognitive Absorption and Beliefs About Information Technology Usage, *MIS Quarterly*. 2000; 24 (4): 665-694.
- [20] Mackenzie, Lutz, & Belch. The Role of Attitude toward the Ad as a Mediator of Advertising Effectiveness: A Test of Competing Explanations, *Journal of Marketing Research*. 1986 May:130-143.
- [21] McGloin, R., Hull, K. S., & Christensen, J. L. The social implications of casual online gaming: Examining the effects of competitive setting and performance outcome on player perceptions. *Computers in Human Behavior*. 2016; 59:173-181.
- [22] Walther, J. B., Loh, T., & Granka, L. Let me count the ways: The interchange of verbal and nonverbal cues in computer-mediated and face-to-face affinity. *Journal of Language and Social Psychology*. 2005; 24:36-65.
- [23] Baumgartner, Hans., & Jan-Benedict E. M. Steenkamp. Exploratory Consumer Buying Behavior: Conceptualization and Measurement, *International Journal of Research in Marketing*. 1996; 13:121-137.