

INTERNATIONAL JOURNAL
ON INFORMATICS VISUALIZATIONjournal homepage : www.joiv.org/index.php/joivThe Effectiveness of a Virtual Reality Marketing Video on the People
Desire to Buy a ProductSigit Wijayanto^{a,*}, Jouvan Chandra Pratama Putra^a^a Faculty of Engineering and Computer Science, Universitas Bakrie, Jakarta, IndonesiaCorresponding author: *sigit.wijayanto@bakrie.ac.id

Abstract— Virtual Reality technology can provide new experiences and different points of view of activities, events, or products for the users. In line with advances from VR technology, YouTube initiates to support the spread of VR videos by creating a VR feature on their platform. A hundred videos about a dangerous activity, Horror activity, and Marketing video of software or a movie product are found on the YouTube platform. Meanwhile, it is still not yet known how the effectiveness of an advertisement using VR video via the YouTube platform on the people desires to buy a product, especially in Indonesia, which then became the purpose of this study. In carrying out this study, a quantitative study was used by creating a digital questionnaire and distributed it with Google Forms. Then the data obtained will be processed by the respondent demographics and the 4 types of analysis, such as the Validity analysis, the Reliability analysis, the Ranking of VR applications on product promotions, and the Correlation analysis. Afterward, the study found that the B1 and B2 variables refer to Advertising, making it easy for us to understand the product has the most correlation coefficient. Moreover, 80% of the respondents stated that they like the VR advertisement product. It means that people are interested in trying and feel something new in the way VR technology is given to them. Ultimately, the respondents agree that VR advertising has informed them well about the product.

Keywords— YouTubeVR; virtual reality; marketing.

Manuscript received 25 Nov. 2020; revised 29 Dec. 2020; accepted 1 Apr. 2021. Date of publication 31 Dec. 2021. International Journal on Informatics Visualization is licensed under a Creative Commons Attribution-Share Alike 4.0 International License.



I. INTRODUCTION

Along with technological developments that have occurred very rapidly in recent years, many changes have occurred in the marketing world. Marketing initially used leaflets, newspapers, television, until nowadays they are using digital marketing and social media. The last term, social media, is currently being carried out very intensively by various manufacturers. Moreover, using social media is considered cheaper and more effective compared to other marketing methods [1], [2]. Besides, digital marketing and social media marketing has a high percentage of effectiveness, especially when we use ads on social media [3]. This is also proven by a survey conducted by adobomagazines in 2016 [4], where social media ads ranks at the top in terms of the effectiveness of digital marketing of a product (see Figure 1).

Apart from the high level of effectiveness, users will also get a different experience from marketing through social media, because it brings the advertisement directly to the users' hand. The social media platform continues to improve

in order to support and get the technology to a higher level along with the rapid technological developments.

On the other hand, the virtual reality (VR) technology, which is a real-world virtualization technology into a synthetic world, that is limited by regulations such as government regulations, time and gravity [5], [6], [7] or in other definition, a technology that makes it possible to simulate a real environment in which the user can experience the feeling of being present [8], [9], has grown very rapidly. This is based on forecasting data from Superdata Research in 2020, the sales from the VR technology was 21 times higher than in 2016 (from US\$2.9 billion to US\$ 61.3 billion) [10]. The VR technology This technology also has attracted the marketers based on the novelty, uncertainty, complexity and its potential conflict it presents for marketing [11], [12], [13], [14], [15]. The Marketers want to utilize this technology in their marketing strategy for their products, such as software application products and movie products, to create a new user experience for their customer target [16]. Simultaneously, YouTube, a social media platform for online video streaming providers, has offered a VR video feature on their platform [17]. This feature would be activated by clicking on the

cardboard icon, which available only on VR videos. Then, the video will be displayed to the VR videos and can be seen by using VR glasses, which is very cheap and easy to find nowadays [18].

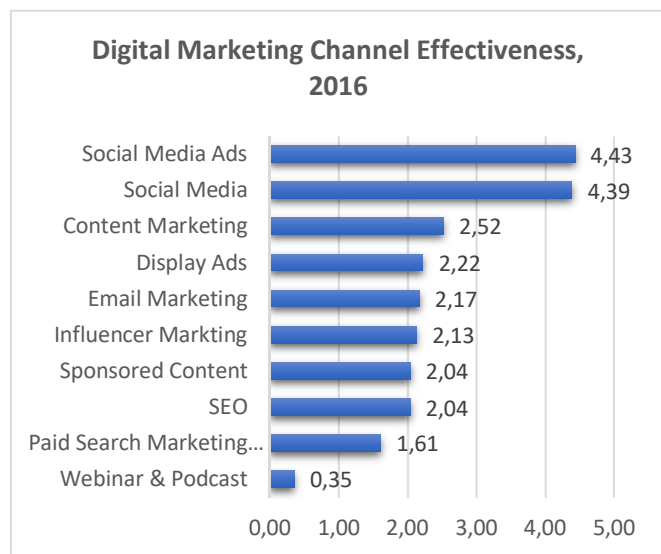


Fig. 1 Digital Marketing Channel Effectiveness [4]

From the marketing videos that have been carried out with VR technology on the YouTube platform, it is considered to have been able to provide a new user experience for the YouTube viewers. Studies have proven this understanding using text mining on the use of VR in marketing [19]. Besides, user experience is one of the key factors in selling a product. When a product can present a new or better user experience than the previous one, it will have a good impact on sales of the product. This is considered a revolutionary approach that will connect the sensation of using a product with a new level of satisfaction from the customer or even the prospect of the product [20], [21], [22].

Furthermore, in this study, the Demographic of the respondents, the Validity analysis, the Reliability analysis, the ranking of VR applications on product promotions, and the Correlation analysis will be calculated to reach its purpose to analyze the effectiveness of a VR video on the people desire to use and buy a product that advertised using VR technology.

II. MATERIAL AND METHOD

This research was accomplished through literature research, and many parameters related to VR and its advantages were drawn and tested in this stage. Data collection was conducted through personal questionnaire surveys [23], [24]. Many experienced interviewees were selected from the millennial generation. Respondents were asked to rank the significance level of factors affecting their preference regarding VR applications. A five-point likert-scale of 1 to 5 was adopted to assess the degree of significance of each cause where 1=ED=extremely disagree, 2=D= disagree, 3=N= neutral, 4=A= agree, 5=EA= extremely agree. Here are the questions in the survey that include the five-point Likert-scale as shown in Table I. These questions were based on the Study from Setiawan [25].

TABLE I
QUESTION LIST FOR THE SURVEY

No	Questions	ED	D	N	A	EA
1	The advertisement can be viewed with or without Virtual Reality (VR) devices					
2	Advertising makes it easy for us to understand the product					
3	The product visualization is attractive					
4	The advertisement is not boring					
5	The advertisement is very interesting					
6	The advertisement give users a different view of a product					
7	The advertisement increases the desire to use the product					
8	This advertisement can be seen and enjoyed by various groups					
9	Users watch this advertisement more than 1 time					
10	The advertisement is able to provide the required information about the product					
11	The advertisement is able to produce information on a product that can be clearly understood					
12	You will use the advertised product after watching this advertisement					

Moreover, 2 YouTube VR videos were used in this survey, namely “Google Tilt Brush” and “The Conjuring 2; Experience Enfield VR 360” [26], [27], [28]. The result will then be categorized by alphabetically sort, which number 1 will be represented by A, number 2 will be represented by B and so on. Later on, the Google Tilt Brush advertisement will be represented by number 1 and The Conjuring 2; Experience Enfield will be represented by number 2. Then the questions table will be explained in Table II;

TABLE II
QUESTION LIST NUMBERING AND IDENTIFICATION

No	Questions	ED	D	N	A	EA
A1	The advertisement can be viewed with or without Virtual Reality (VR) devices					
A2	The advertisement can be viewed with or without Virtual Reality (VR) devices					
B1	Advertising makes it easy for us to understand the product					
B2	Advertising makes it easy for us to understand the product					
C1	The product visualization is attractive					
C2	The product visualization is attractive					
D1	The advertisement is not boring					
D2	The advertisement is not boring					
E1	The advertisement is very interesting					
E2	The advertisement is very interesting					
F1	The advertisement give users a different view of a product					
F2	The advertisement give users a different view of a product					
G1	The advertisement increases the desire to use the product					
G2	The advertisement increases the desire to use the product					
H1	This advertisement can be seen and enjoyed by various groups					
H2	This advertisement can be seen and enjoyed by various groups					

I1	Users watch this advertisement more than 1 time
I2	Users watch this advertisement more than 1 time
J1	The advertisement is able to provide the required information about the product
J2	The advertisement is able to provide the required information about the product
K1	The advertisement is able to produce information on a product that can be clearly understood
K2	The advertisement is able to produce information on a product that can be clearly understood
L1	You will use the advertised product after watching this advertisement
L2	You will use the advertised product after watching this advertisement

Data was analysed by using average index method as follows:

Average Index (AI) [29]:

$$\frac{\sum(1x1+2x2+3x3+4x4+5x5)}{\sum(x1+x2+x3+x4+x5)} \quad (1)$$

Equation 1, Average Index [29].

Where:

- X1 = No of respondents for "Extremely Agree"
- X2 = No of respondents for "Agree"
- X3 = No of respondents for "Neutral"
- X4 = No of respondents for "Disagree"
- X5 = No of respondents for "Extremely Disagree"

Evaluation ranges to assess significant level as adopted by Abdullah [29] was used in this study as follows:

- 1.00 < AI < 1.50 Extremely Significant
- 1.50 < AI < 2.50 Very Significant
- 2.50 < AI < 3.50 Moderately Significant
- 3.50 < AI < 4.50 Slightly Significant
- 4.50 < AI < 5.00 Not Significant

However, since the approach to obtain the respondents' preference was an inverse concept from the AI, then the assessment of AI used the largest value to the small value. Subsequently, a set of questionnaires was designed to evaluate product marketing's correlation using VR applications on customer interest. Once the data was collected from the questionnaire, the correlation test used to assess the strength of the variance of VR applications toward respondent preferences. Since the data collected in this study are non-parametric variables and ordinal variables, Spearman's correlation was used to test the correct method of the relationship between variable pairs. The correlation value coefficient ("ρ") ranges from -1.0 to +1.0. The closer ρ is to +1.0 or -1.0, the closer the relationship between the two variables. A value of ρ close to 1 indicates a strong positive linear relationship between the two variables, and a value of ρ close to -1 indicates a strong negative linear relationship between the two variables. Ideally, the correlation coefficient value ±1 is called perfect correlation.

Assuming that the correlation coefficient value is between ±0.5 and ±1, it is regarded as a high correlation, and for the

correlation coefficient value between ±0.3 and ±0.5, it is regarded as a moderate correlation. If the correlation coefficient value is between ±0.1 and ±0.3, then it is considered low correlation, and assuming that the correlation coefficient value is near zero, then there is no correlation.

III. RESULTS AND DISCUSSION

A total of 56 sets of questionnaires were distributed to respondents. All distributed questionnaires will be received. The data from the questionnaire is as follows:

TABLE III
QUESTION LIST NUMBERING, IDENTIFICATION AND THE RESULT

No	Questions	ED	D	N	A	EA
A1	The advertisement can be viewed with or without Virtual Reality (VR) devices	4	3	9	25	15
A2	The advertisement can be viewed with or without Virtual Reality (VR) devices	1	2	11	25	17
B1	Advertising makes it easy for us to understand the product	0	0	5	30	21
B2	Advertising makes it easy for us to understand the product	0	3	8	25	20
C1	The product visualization is attractive	1	1	5	20	29
C2	The product visualization is attractive	0	3	13	19	22
D1	The advertisement is not boring	0	1	10	22	24
D2	The advertisement is not boring	0	3	13	20	20
E1	The advertisement is very interesting	0	1	8	25	22
E2	The advertisement is very interesting	0	5	13	22	16
F1	The advertisement give users a different view of a product	0	1	7	29	19
F2	The advertisement give users a different view of a product	0	2	10	25	19
G1	The advertisement increases the desire to use the product	0	3	9	20	24
G2	The advertisement increases the desire to use the product	0	5	18	17	16
H1	This advertisement can be seen and enjoyed by various groups	1	2	10	27	16
H2	This advertisement can be seen and enjoyed by various groups	2	10	23	16	5
I1	Users watch this advertisement more than 1 time	0	5	16	24	11
I2	Users watch this advertisement more than 1 time	0	4	24	20	8
J1	The advertisement is able to provide the required information about the product	0	1	7	33	15
J2	The advertisement is able to provide the required information about the product	0	1	15	28	12
K1	The advertisement is able to produce information on a product that can be clearly understood	0	0	8	35	13
K2	The advertisement is able to produce information on a product that can be clearly understood	0	1	14	33	8
L1	You will use the advertised product after watching this advertisement	0	4	27	13	12
L2	You will use the advertised product after watching this advertisement	0	4	30	13	9

Later on, the data was analyzed using R 3.5, and the survey results are introduced and discussed in the following subsections.

A. Demographics of Respondents

Out of 56 respondents performed in this survey, 35 are males, and 21 are females. For assessing the preference of respondents, a number of questionnaires related to attracting or inviting customers to buy the products due to the application of VR were asked. The survey found that the domicile of respondents varied widely and presented as in Figure 2.

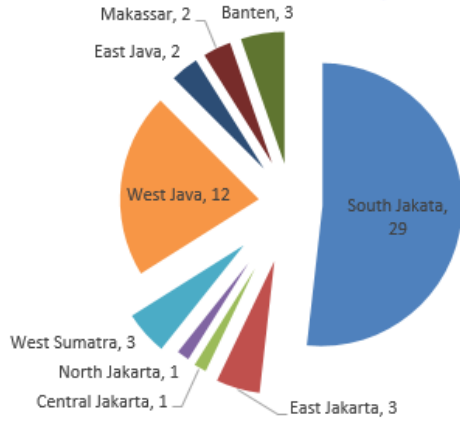


Fig. 2 Respondents' domicile

B. Validity

In preliminary research, it is necessary to conduct validity tests to assess whether the research purpose's instruments are suitable. This can be achieved by using the following Pearson correlation equation [30]:

$$r_{xy} = \frac{n\sum XY - (\sum X)(\sum Y)}{\sqrt{(n\sum X^2 - (\sum X)^2)(n\sum Y^2 - (\sum Y)^2)}} \quad (2)$$

Equation 2, Validity [30].

Where;

- r_{xy} : Correlation coefficient
- n : The number of respondents
- X : Score of each item of the questionnaire
- Y : Score of all items of the questionnaire

Once the calculation of the Pearson correlation is completed, the t value is then calculated. It can be achieved by the following formula [31]:

$$t_{\text{calc}} = \frac{r_{xy} \sqrt{(n-2)}}{\sqrt{(1-r_{xy}^2)}} \quad (3)$$

Equation 3, Pearson Correlation [31].

Besides, the value of t_{calc} is compared with the t table to determine which question in the questionnaire list is invalid or valid. The results are listed in Table IV.

TABLE IV
FACTORS CONSIDERED ON VR APPLICATIONS

No	Factors	t_{calc}	t table	Results
1	A1	0.174	0.4044	Invalid
2	A2	0.140	0.4044	Invalid
3	B1	0.480	0.4044	Valid
4	B2	0.497	0.4044	Valid
5	C1	0.345	0.4044	Invalid

6	C2	0.627	0.4044	Valid
7	D1	0.516	0.4044	Valid
8	D2	0.502	0.4044	Valid
9	E1	0.521	0.4044	Valid
10	E2	0.567	0.4044	Valid
11	F1	0.618	0.4044	Valid
12	F2	0.603	0.4044	Valid
13	G1	0.414	0.4044	Valid
14	G2	0.449	0.4044	Valid
15	H1	0.257	0.4044	Invalid
16	H2	0.142	0.4044	Invalid
17	I1	0.355	0.4044	Invalid
18	I2	0.239	0.4044	Invalid
19	J1	0.463	0.4044	Valid
20	J2	0.502	0.4044	Valid
21	K1	0.503	0.4044	Valid
22	K2	0.529	0.4044	Valid
23	L1	0.473	0.4044	Valid
24	L2	0.537	0.4044	Valid

If the value of t_{calc} is less than the value of the t table, an indication of invalidity is identified. According to Table IV, 7 questions were found to be invalid and 17 questions were valid.

C. Reliability

Conduct reliability assessments to find the stability and consistency of the data [30]. This is achieved by using the commonly used Cronbach alpha. When the value of Cronbach's α is less than 0.3, the reliability of the data is considered to be at a low level. This means that the data is unreliable and unacceptable. Subsequently, when the value of Cronbach's α is greater than 0.7, the reliability of the data will be recognized at a higher level [31]. The calculation and list of Cronbach's α values are shown in Table V.

TABLE V
RELIABILITY STATISTICS

No. of Items	Cronbach's α
24	0.862

Table V shows the statistical reliability tests for the factors considered in VR applications. The results show that Cronbach's Alpha is 0.862, which is classified as a high level. Therefore, the data is worthy of further study.

D. Ranking of VR applications on product promotions

A hierarchical evaluation of factors is carried out from the collected data to determine the factors considered in the study of the effectiveness of a VR marketing video. This is done by using the average index (AI). The results are shown in Table VI.

TABLE VI
FACTORS CONSIDERED ON VR APPLICATIONS ON PRODUCT PROMOTIONS

No	Factors	Average Index (AI)	Ranking
1	B1	4.28	1
2	B2	4.107	6
3	C2	4.071	10
4	D1	4.232	2
5	D2	4.0178	11
6	E1	4.214	3
7	E2	3.803	15
8	F1	4.178	4
9	F2	4.089	8

10	G1	4.160	5
11	G2	3.785	16
12	J1	4.107	7
13	J2	3.910	12
14	K1	4.089	9
15	K2	3.857	14
16	L1	3.859	13
17	L2	3.482	17

The table shows that the B1 with an AI value of 4.28 is the most important factor affecting the VR applications. In addition, in terms of D1, E1, F1, and G1 are also considered extremely important factors with their AI value of 4.232; 4.214; 4.178, and 4.160 consecutively.

E. Correlation Analysis

In the questionnaire survey, the respondents were asked to rate based on a 5-points Likert scale whether the video content, the information present and the virtual reality technology involved in the video impact the people's desire to buy a product. The result of this assessment is presented in Table VII.

TABLE VII
FACTORS CONSIDERED ON VR APPLICATIONS ON PRODUCT PROMOTIONS

No	Variables Involved	Correlation Coefficient	Sig. (2-tailed)	Significant
1	B1 and B2	0.605	0.000	Y
2	D1 and D2	0.469	0.000	Y
3	E1 and E2	0.365	0.000	Y
4	F1 and F2	0.487	0.000	Y
5	G1 and G2	0.368	0.0025	Y
6	J1 and J2	0.552	0.000	Y
7	K1 and K2	0.430	0.0005	Y
8	L1 and L2	0.438	0.0005	Y

Table VII shows that the values obtained for significant variables are in the range of 0.368 to 0.605. The greatest correlation was presented from variables B1 with B2 and J1 with J2, namely the advertising capacity to make it easier for customers to get information about these products and understand them easily.

IV. CONCLUSION

In this paper, it has been shown that the innovation of VR is carried out by using a quantitative approach. The survey has been spread out using google forms digital questionnaires to the public and getting feedback from 56 respondents. The respondents mostly come from Jakarta, with 34 peoples and 12 peoples from West Java, respectively. Furthermore, a small number of respondents from outside the island of Java included Makassar, south of Sulawesi and West Sumatra.

The data obtained is then processed using 4 approaches: the validity analysis, the reliability analysis, the Ranking of VR applications on product promotions, and the Correlation analysis. By using the Validity analysis, an analytical assessment will be shown of the data whether the instruments used are suitable for the research purpose or not. In this analysis, we will also use the Pearson correlation equation and the t-value calculation formula. After this analysis was carried out, it was found that there were 7 invalid data instruments.

Then has been decided that these 7 invalid data instrument will be no longer used in the research. Furthermore, the

Reliability analysis will be carried out to find the stability and consistency of the data. In this analysis, Cronbach's Alfa approach will be used, and it has produced a score of 0.862, which is a high-level classification so that the data can be used for further study.

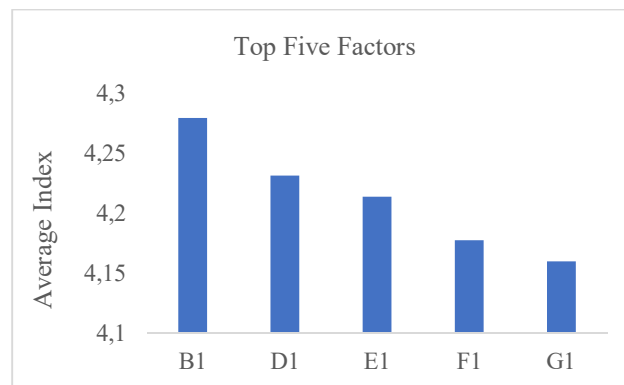


Fig. 3 Top five significant indicators related with VR promotions

Furthermore, the top five rank of VR parameters have been calculated and presented in Fig. 3, in which B1 as the number one factor consider on the VR application on product promotions. Later on, the correlation analysis was done at last. Based on this analysis, we obtained significant variables are in the range of 0.368 to 0.605, with the greatest correlation was presented from variables B1 with B2 and J1 with J2.

After conducting the survey and the 4 analyses, it can be concluded that the use of VR technology in marketing will have a very good impact on product sales based on the public or market target desire to buy the product. Where the target market will have a new user experience, even before they have the product. This is because the product can be used by the user individually and it is available at any time, as long as the user has the VR devices such as VR glasses and can access the VR marketing videos. This is proven by the answers from number J1, J2, K1 and K2, where most respondents agree to the statement that the VR marketing videos provide clear information and knowledge that needed by the target market, therefore the VR marketing videos influence them for buying the product.

Then 13 respondents answered agree that they preferred to use the 2 products offered after watching the VR marketing videos. Furthermore, there are about 12 people who wanted to use product 1 and there are 9 people who wanted to use product 2 after watching the 2 research objects. Exploring this theme will need further research that should focus on user experience, virtual reality technology, and which content types will positively impact product marketing.

ACKNOWLEDGMENT

We are grateful to the respondents for the non-technical supports during the survey regarding this study.

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