



A Preliminary Study on 360⁰ Immersive Virtual Reality (IVR) vs Non - Immersive Virtual Reality (N-IVR) of Event Marketing

Emma Nuraihan Mior Ibrahim¹, Suhaida Juhari²

¹Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, 40450, Shah Alam, Selangor, Malaysia.

¹emma@tmsk.uitm.edu.my

²suhaida_juhari@yahoo.com

ABSTRACT

Immersive virtual reality (IVR) has become a popular tool for experiential marketing to empower people experience and user's engagement. Many organizations have opted for virtual reality approach towards conveying brand experiences, promotional tools and consumer personalization through this interactive technology. IVR is known to arouse user emotional responses and engrave user behavior. The objective of this study is to conduct a preliminary study on user interaction with 360⁰ IVR and non-immersive virtual reality (N-IVR) for a virtual event marketing. The research is attempt to compare the user presence and immersion with different virtual reality interactivity in the context of event campaign and marketing. The 360⁰ IVR and non - IVR video content on real estate housing event were developed and was used as the promotional content for Company A, a local event company to market their services to potential client. A focus group session consists of 10 potential clients participated in the experimental work using 360⁰ IVR and non-IVR interaction (N-IVR). The immersive and non-immersive interaction were measured using Presence measurement questionnaire and Positive and Negative Affect (PANAS) questionnaire. A descriptive analysis was conducted and experience with 360⁰ immersive virtual content gives positive results and better experience about an event compare to the non-immersive virtual reality. The implication of this research and its future work are discussed.

Key words : Experiential Marketing, Immersive Virtual Reality (IVR), Non-Immersive Virtual Reality, 360⁰ Video Content

1. INTRODUCTION

The proliferation of the Internet, social networks and mobile technology has long considerable impact towards the success of marketing [1], [2]. E-commerce for example has connected the users to global marketplace, enhance virtual businesses opportunities as well as linking marketers with consumers. Whereas with the mobile technology it allows the user to

conduct their business activities at anytime and anywhere. However, as technology becomes more sophisticated, businesses and marketers have seen great potentials in virtual reality technology as a platform for better consumer experiences and engagement that resemble real physical stores or situations. In the literature, virtual reality has been successfully researched in various domain such as gaming [3], entertainment [4], education [5], product design [6], medical [7], military [8], psychology [9] and communications [10]. Therefore, it is not surprising that more businesses and marketers are leveraging into this technology as a new form of marketing channel particularly to today digital native generation. In fact, Forrester's marketing media estimates, by 2020 the volume of VR mirrors in the market will increase to 52 million units and be used for various needs [11]. Major smartphone manufacturers and social media players such as Google, Facebook, YouTube have already setting up VR platforms in their product design. At the same time, technological advances have made the medium available to consumers in the form of 360 videos watched on smartphone. In addition, companies like Samsung, LG, Sony and HTC have already launched head-mounted devices (HMDs) for VR content viewing.

Though IVR has been explored widely especially in destination marketing and tourism [12], however the relationship between consumer experience and the usage of IVR as a promotional tool in the virtual event marketing is relatively explore. There is still less literature from the Malaysia case studies that address this matter. It is important to investigate and understand how IVR play it roles in providing potential consumers with the most realistic experience of a product, service or place yet without necessary physical co-location. Previous research has shown, real-estate agents can start promoting as of yet unbuilt developments to potential customers as clients can take a look the physical site in the digital world virtually without having to go to the real site [13]. Therefore, this research is attempt to investigate the effect of presence and immersion on potential consumers with 360⁰ IVR and non-IVR interaction for virtual marketing purposes.

2. LITERATURE REVIEW

2.1 Experiential marketing

The definition of experiential marketing has been addressed in the literature from a multidimensional construct. It was first coined by Schmitt [14]. He defines it as a marketing tool that need to deliver experiential value such as emotional values, functional values and customer satisfaction [14]. Other researchers such as Lee, Hsiao and Yang [15], Same and Larimo [16], Muthiah [17] argued that experience marketing is trying to stimulate marketing experts to increase the total experience quality for customers using brand positioning, stimulus, emotional interaction including rational decision making and creating consumption experience connected to emotions.

In today’s service economy, creating experience that a customer value has become a competitive advantage [18]. This is because products and services are becoming increasingly interchangeable. Experience itself has become a commodity for a business. Consumers are not just satisfied with highest quality of products and services but they are looking for new positive experiences in the market leaving them with memorable event associated with the products and services. This process may in turn affects consumer behavior which eventually leads to further product/service engagement and brand loyalty. Therefore, marketing trends started to evolve to a different direction, in which the previous marketing concepts by using ads, brochure, flyers, tv commercials, and the Internet became outdated.

In the literature, there are studies on how VR technology is used in providing experiential marketing such as tourism [12], [19] – potential tourists can take a virtual tour prior to the destination; real-estate [13], architecture [20] – a potential clients can virtually view a property/ building without having to go for a real site visit; food/dining experience [21] – a customer can have an overview of the restaurant and food options prior for booking.

2.2 Virtual reality (VR) – Definition and Concept

VR is a communication medium that provide users with 3-dimentional (3D) or 360-degree computer-generated virtual environment. 3D video technologies are known to provide more immersive content compared to the conventional 2-dimensional (2D) video content [22]. Virtual Reality (VR) is a mediated environment which creates the sensation in a user of being present in a (physical) surrounding. In other words, transferring reality into the virtual world. It enables user to interact with the virtual world to feel the closets feel and experience in real world.

There are three types of VR (a) non-immersive –it involves implementing VR on a desktop computer. User view the virtual environment through a portal or window and interact by conventional means such as keyboard, mouse or trackball. This is the least technique opted by users. (b) semi-immersive – comprise relatively high-performance computing graphic systems that provide greater sense of presence compare to non-immersive approach. (c) immersive (fully immersive) – the most direct experience of virtual environment where the users wear Head Mounted Display (HMD) or any head coupled display [23]. These different types of VR are categorized by the level of immersion as tabulated by Kalawsky [24] (Table 1).

Table 1: Qualitative performance of different VR systems (adapted from Kalawsky [24])

Main Features	Non- Immersive VR (Desktop)	Semi-Immersion VR (Projection)	Full Immersion VR (Head-coupled)
Resolution	High	High	Low - Medium
Scale (perception)	Low	Medium - High	High
Sense of situational awareness (navigation skills)	Low	Medium	High
Field of regard	Low	Medium	High
Lag	Low	Low	Medium - High
Sense of immersion	None - low	Medium - High	Medium - High

In addition, VR content is often described based on these three principles [25], [26], [27]: (a) presence – is describes as the subjective experience of being in one place or environment, even when one is physically situated in another [25], (b) immersive - subjective psychological experience for example, the user feels just as immersed as in real life with the use of VR devices [27], (c) interactivity – interactive experience of the users while navigating the virtual world [25], [26]. It is also said that presence and immersion may potentially reach the highest level of reality experiences [27].

3. RESEARCH METHODOLOGY

3.1 Virtual reality content development

The 360° videos for immersive and non-immersive VR content showcase a real-estate event as part of promotional tools for Company A, a local event company that provide services in managing and coordinating corporate events (refer to Figure 1, Figure 2 and Figure 3). The video is developed for 3 minutes in duration. This content is

developed to give an overview for potential clients to understand Company A services also act as the company business portfolio. For the development, the content was developed using Samsung Gear 360° camera, Samsung S7 Edge smartphone, MSi Laptop and Camera tripod (hardware)-Samsung Gear 360° Action Director, Adobe Premiere cc, Unity 3D, Microsoft Visual Studio, VLC Media Player and Android Studio (software).

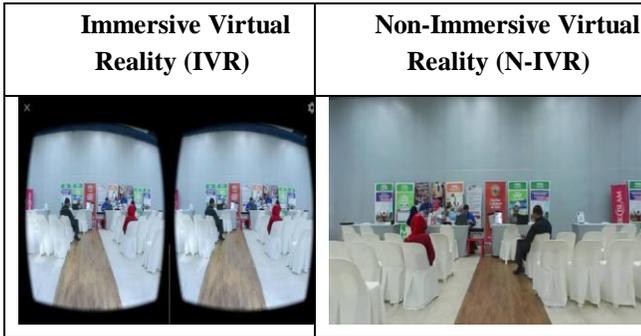


Figure 1: Images of Immersive Virtual Reality vs Non Immersive Virtual Reality



Figure 2: Images of 360° video content



Figure 3: Images of 360° video content

3.2 Focus group

A total of 10 prospective clients on voluntary basis participated in this study. The study was conducted at the Company A’s discussion room with proper setup on the 360° IVR and non-IVR with desktop devices. The participants are divided into two groups, 5 of them performed the 360° IVR and another 5 participants participated in the non-IVR session. The sessions were scheduled on separate days for each of them allowing approximately one hour for each participant in each session (refer to Figure 4). At the end of the session, a token of appreciation was given to all participants.



Figure 4: A participant is experiencing the 360° IVR using head mounted device.

3.3 Presence and immersive questionnaires

For this study, the Presence Measurement Questionnaire is adopted from Tcha-tokey, Christmann, Loup-escande, and Richir [28] while the Positive and Negative Affect Schedule (PANAS) is adopted from Watson, Clark and Tellegan [29]. PANAS is a self-report questionnaire that consists of 20-item scales to measure both positive and negative affect whereas Presence that consists of 10-items scales to measure the participant’s “sense of being there” referring to the virtual scenario. Then, a descriptive analysis is performed and tabulated for the results.

4. ANALYSIS AND RESULTS

The comparative results between the immersive virtual reality (IVR) and non-immersive virtual reality (N-IVR) 360° video content is analyzed in order to identify which platforms is better in enhancing the experience of the user.

For the study on Presence (refer to Table 2) it shows comparative results among the participants when using the 360° immersive virtual reality (IVR) and non-immersive virtual reality (N-IVR) based on the mean calculated. The mean represents average rating that is given by the participants. The higher the mean it shows the rating or feelings on the experience. Based on Table 2, almost all questions return positive outcome based on the mean in column 360° IVR except for element of “negative experience

of feeling fatigue in interaction” which indicate a lower mean of 2.1. However, this do not indicate as a negative outcome but it shows that the participants do not feel fatigue when interacting with 360° IVR.

Table 2: Summary of mean for Presence Measurement Questionnaire

Presence Measurement	Immersive Virtual Reality (IVR)	non-Immersive Virtual Reality (NIVR)
Responsive to action	4.2	3.5
Sense of Moving around	4.6	2.7
Felt stimulated by the Virtual	4.4	2.8
Felt could perfectly control action	4.3	2.8
Interaction devices	4.2	2.6
Enjoyed being in Virtual Environment	4.8	3.3
Virtual environment is practical	4.5	3.4
Fatigue during interaction with the virtual environment	2.1	2.6
Use the same virtual, interaction with environment would be clear	4.4	3.6
Virtual aspects of the environment	4.1	3.0
The auditory aspects of the environment	4.5	3.0
Experiences in virtual environment	3.4	2.8

For the study on Positive and Negative Affect Schedule (PANAS) questionnaire, the results show higher mean in all elements except for “upset”, “guilty”, “hostile”, irritable” “jittery”, “afraid” and “ashamed” (refer to Table 3). This indicate that none of these elements appear to be significant to the participants based on the content of the video.

Table 3: Summary of mean for PANAS Questionnaire

PANAS Questionnaire	immersive Virtual Reality (IVR)	non-immersive Virtual Reality (NIVR)
Interested	4.5	4.0
Distressed	1.9	2.0
Excited	4.5	3.5
Upset	1.2	1.8
Strong	2.9	3.0
Guilty	1.1	1.2
Scared	1.8	1.2
Hostile	1.1	1.4
Enthusiastic	4.4	3.3
Proud	4.3	3.5
Irritable	1.4	1.5
Alert	3.3	2.9
Ashamed	1.3	1.1
Inspired	4.5	4
Nervous	2.4	1.3
Determined	3.7	2.9
Attentive	4.3	3.6
Jittery	1.7	2.7
Active	3.9	2.9
Afraid	1.7	1.0

5. CONCLUSION AND FUTURE DIRECTION

In summary, the objective of this study is to investigate the effect of 360° IVR and non – IVR to potential clients for an event management company. The overall results for PANAS and Presence shows that by using 360° IVR application the participant’s experience are heightened. However, there are limitations in this study. First, there is no correlation analysis being done between those items in the measurement instruments. At this stage the research is attempt to explore the feasibility of the 360° IVR usage in the context of experiential marketing among real estate companies. In addition, the respondents are limited to 10 participants which can only give us partial knowledge on the user experience with 360° IVR. For future work, we will expand the numbers of participants to gauge a thorough understanding on VR and its association with experiential marketing. A detail quantitative analysis will be done to examine the associated variables which then contribute to our future conceptual model for virtual experiential marketing from a local cultural perspective.

REFERENCES

1. Babić Rosario, A., Sotgiu, F., De Valck, K., and Bijmolt, T. H. (2016). **The effect of electronic word of mouth on sales: a meta-analytic review of**

- platform, product, and metric factors.** J. Mark. Res. 53, 297–318. doi: 10.1509/jmr.14. 0380
2. Kannan, P. K., and Li, H. A. (2017). **Digital marketing: a framework, review and research agenda.** Int. J. Res. Mark. 34, 22–45. doi: 10.1016/j.ijresmar.2016. 11.006
 3. Cruz-Neira, Carolina & Fernández, Marcos & Portalés, Cristina. (2018). **Virtual Reality and Games.** Multimodal Technologies and Interaction. 2. 8. 10.3390/mti2010008.
 4. Burt, Malcolm & Louw, Candice. (2019). **Virtual reality enhanced roller coasters and the future of entertainment – audience expectations.** World Leisure Journal. 61. 1-17. 10.1080/16078055.2019.1639274.
 5. Mikołajczyk, Katarzyna. (2019). **VR in education - a subjective overview of the possibilities.** 10.15219/em79.1410.
 6. Chen, Chen & Cho, Joung. (2018). **Research on the Influence of VR Technology on Product Design.** 10.2991/iserss-18.2018.25.
 7. Riener, Robert & Harders, Matthias. (2012). **VR for Medical Training.** 10.1007/978-1-4471-4011-5_8.
 8. Presnall, Biljana. (2019). **International military cooperation with medical VR training.** International military cooperation with medical VR training.
 9. Strimbu, Nicole. (2018). **VR in Psychology - Increasing Ecological Validity.**
 10. Yang, Hocheol. (2019). **Theoretical approaches for HMD VR in communication education.**
 11. TrendForce (2015) 'Forecasts VR Market Value to Hit US\$70 Billion in 2020 as Innovative Apps Enrich This Industry'. Available at: <http://press.trendforce.com/node/view/2210.html#PzdVbPotofvzSLJ1.99> (Accessed: 4 March 2019)
 12. Tussyadiah, I., Wang, D. and Jia, C. (2016) **Exploring the Persuasive Power of Virtual Reality Imagery for Destination Marketing.**
 13. Kaleja, p. and Kozlovská, P. (2016) **'Virtual reality as marketing tool for developer projects'**, Czech Journal of Civil Engineering, pp. 65-70.
 14. Schmitt, B. (2010): **Experience Marketing: Concepts, Frameworks and Consumer insights.** Foundations and Trends in Marketing, Vol. 5, No. 2, pp. 55-112.
 15. Lee, M. S., Hsiao, H. D. and Yang, M. F. (2010): **The Study of the Relationship Among Experiential Marketing, Service Quality, Customer Satisfaction and Loyalty.** International Journal of Organizational Innovation, Vol. 3, No. 2, pp. 352-378.
 16. Same, S., Larimo, J. (2012): **Marketing Theory: Experience Marketing and Experiential Marketing**, 7th International Scientific Conference "Business and Management 2012, May 10-11, 2012, Vilnius, Lithuania, pp. 480-487.
 17. Muthiah, K. (2013): **Experiential Marketing - A Designer of Pleasurable and Memorable Experiences.** Journal of Business Management & Social Sciences Research, Vol. 2, No. 3, pp. 28-34.
 18. Yeoman, Ian & McMahon-Beattie, Una. (2019). **The experience economy: micro trends.** Journal of Tourism Futures. 10.1108/JTF-05-2019-0042.
 19. Han, Jong-Sung & Lee, Geun-Ho. (2015). **VR Tourism Content Using the HMD Device.** The Journal of the Korea Contents Association. 15. 40-47. 10.5392/JKCA.2015.15.03.040.
 20. Racz, Anett & Zilizi, Gergo. (2018). **VR Aided Architecture and Interior Design.** 11-16. 10.1109/ICACCE.2018.8441714.
 21. Addis, Michela & Holbrook, Morris. (2019). **From food services to food experiences.** 10.4324/9781351182201-2.
 22. Kandaurova, Maria & Lee, Seung. (2018). **The effects of Virtual Reality (VR) on charitable giving: The role of empathy, guilt, responsibility, and social exclusion.** Journal of Business Research. 100. 10.1016/j.jbusres.2018.10.027.
 23. F. Biocca, and B. Delaney, **"Immersive Virtual Reality Technology"**, in Biocca, F., and M.R. Levy (eds.), Communication in the Age of Virtual Reality, Lawrence Erlbaum, Hillsdale, NJ, 1995, pp. 57-124.
 24. Kalawsky, R. S. (1996). **Exploiting virtual reality techniques in education and training: Technological issues.** Loughborough University of Technology: Advanced VR Research Centre. <http://www.agocg.ac.uk/reports/virtual/vrtech/toc.htm>
 25. G.C. Burdea, and P. Coiffet, **Virtual Reality Technology**, John Wiley & Sons, Hoboken, NJ, 2003.
 26. Ryan, M.-L., **Narrative as Virtual Reality 2: Revisiting Immersion and Interactivity in Literature and Electronic Media**, John Hopkins University Press., Baltimore, MD, 2015.
 27. K.R. Walsh, and S.D. Pawlowski, **"Virtual Reality: A Technology in Need of IS Research"**, Communications of the Association for Information Systems (8:article 20), 2002, pp. 297-313.
 28. Tcha-tokey, K., Christmann, O., Loup-escande, E., & Richir, S. (2016). **Proposition and Validation of a Questionnaire to Measure the User Experience in Immersive Virtual Environments.** International Journal of Virtual Reality, 16(April), 33–48. <https://doi.org/10.1145/2927929.2927955>
 29. Watson, D., Clark, L. a., & Tellegan, (1988). **Worksheet 3.1 The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) PANAS Questionnaire.** Journal of Personality and Social Psychology, 54, 1063–1070. https://doi.org/10.1521/soco_2012_1006