Development of Virtual Reality Advertisement for Housing Advertising in Kedah

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Abstract: This paper identifies the use of VR technology in housing advertising industry in the development of a Virtual Reality (VR) based advertisement. This paper focuses on developing image-based VR for the adverts and finding a suitable Internet based platform for viewing these adverts. A show house developed by Amzed Development S dn. Bhd. was chosen as a subject for the VR advertisement development. In the research of this paper, much literature was retrieved and reviewed to identify the use and development of VR advertisement in housing advertising industry. The chosen subject is represented in an image-based VR advertisement and viewed in an Internet based application. The developed VR advertisement was analysed based on the results and developing process, to identify its benefits.

Keywords: housing advertising; housing advertisement; image-based VR; Virtual reality (VR); VR advertisement

I. INTRODUCTION

Virtual Reality (VR) is growing in popularity as a way of marketing in various fields of business due to its ability to stimulate familiar experiences for the customer akin to being in the actual real place, hence enhancing product knowledge, attitude, and purchase intention of customers. In housing market, being able to let customers experience a walk-around in a house without needing to physically visit the house is a great benefit and it can help the seller to attract more customers including internationally from other countries. In western countries, the usage of VR technology in marketing has been widespread in many fields of industry, other than the housing market (Hall,2016). However, the usage of VR technology for marketing in Malaysia is still in the early stages and not widely spread due to being less aware of VR technology and lack of skill in producing VR-based adverts. Lack of understanding of VR technology by the masses has limited the marketer's ability to create marketing content or adverts that may innovatively appeal to their customers (Rao, 2017). The common method of house advertisement, such as distributing brochures, pamphlets, presenting a house model, and showing a walkthrough video have some weaknesses as the customer is unable to get a clear view and feel the presence of the house, since they only get to see the two-dimensional pictures and a small-scale house model in the early stage of decision making.

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Another critical problem that also arises is that some customers are unable to visit the show house due to a few constraints, such as distance, time, and travel expenses. These common methods also cause wastage and loss to the company because this marketing method increases the marketing cost and it is not efficient. So, the objective of this study was;

i.   To identify the use of Virtual Reality(VR)for housing advertising in Kedah, and

ii.   To develop house adverts based on the Virtual Reality (VR) concept.

Housing advertising, it is hoped that it will trigger other industries in Malaysia to use VR technology in their work routine, such as building modelling, town planning, and etc.

II. LITERATURE REVIEW

VR is a computer-generated environment which the user can inter- act with in real time by stimulating human basic sense to trigger sense of presence, hence immersing the user in a virtual environment. The main definitions from the literature are summarised in Table 1.

Table. 1 Definitions of Virtual Reality (VR)

Authors (Year)	Definition
Sutherland (1965)	VR not just as a screen, instead think of it as a window which through it one can look into a virtual world.
Cline, M. S. (2005)	First person view videos, 3D, and video games that are able to stimulate sense of hearing, and possibly touch, taste, and smell, also are part of VR.
Jerald, J. (2015)	A computer-generated digital environment that one can interact with and experience it like the environment was real.
Gregory, J. (2017)	VR is the use of computer graphics and special hardware to make people's mind think they are experiencing something they are not.

Virtual Reality (VR) in Industry

VR technology has the potential to change business models as it is predicted to be leading changes in business processes and organisation of companies, as the result of new products and paradigms, an increase in long distance communication, the development of new tools for organising and managing activities, and the automation of business process (Cline, 2005).

As known by the expert

and VR practitioner the concept of VR has been discussed from a long way back in the1990s,but due to technology limitations, the concept of VR which has been discussed in that time could not be realised then (Chang&Fan,2017). In addition, VR technology application in the industry cannot be realised due to the cost, but now it has begun to change as many people own high-tech devices in their homes. With all of these advancements, the industry is turning their focus on the VR sector and as a result, VR is bigger than ever (Gregory, 2017). The era of VR is predicted to come as the arising of high-tech personal computers and significant performances of displays and sensors. With the participation of big tech company such as Google, Face book, Microsoft, HTC, Samsung, and Apple, the development of VR world is coming to realisation, as envisioned by people for a long time (Chang & Fan, 2017). The need of support from various entities such as the government, corporations, and community are essential in order to realize the dream of creating anera of VR where it is applicable and achievable for everyone.

Virtual Reality (VR) in Housing Marketing

VR is beginning to disrupt real estate industry as we know it because it is opening the door for technology companies to create VR viewings of homes that will enable prospective buyers all over the world to feel as if they are actually physically viewing a property (Brenner, 2017). I Staging Corp, a VR service provider company, also believes that VR/AR technology can disrupt the old common real estate industry (Chang & Fan, 2017). According to Bellini, Business Unit Leader in Telecommunications, Media, and Technology of Goldman Sachs Company, it is much more time efficient for realtors and customers with VR glasses or a head mounted device in use, as the customers are able to do a virtual walk-through around the house without having to physically travel to see all the recommended properties (Lang, 2016). In the housing market, being able to let customers experience the view of a house on the spot without having to visit the house is a great benefit in providing a better ser- vice for their customers, and it can help marketers to attract more customers, including from other countries. VR provides faster, cheaper, and more efficient options to enhance sales kit and marketing approaches. It also creates a self-sustaining ecosystem for players in the real estate industry to grow the network effect in the marketplace and to increase the consumer switching costs (Chang & Fan, 2017). A lot of real estate companies in western countries have embraced this VR technology and apply it in their marketing process, work routines, and etc. Real estate companies in New York has applied the usage of VR real estate tours for their customers to view, where a realistic 3D property can be view through the latest 3D VR goggles provided by the company. There is also a company that exhibits a property that has not been completely built yet, as the VR program and goggles are able to render a 3D experience of how the property will look like when it is complete on site. For them, VR method is cheaper, more convenient, and more interactive than employing an agent to show the property to customer (La Grandeur& Hughes, 2017). A few real estate companies in the US have applied VR in their business, such as Sotheby showing luxury homes in VR and Lowes equip "Holorooms", which helps to envision customer's homere modeling plans (Sachs,2016). As many real estate companies from other countries have embraced VR technology, it is time for the Malaysian real estate company to take a step into the application of VR technology in the real estate industry, so that Malaysia will not be left behind in the era of VR technology.

III. METHODOLOGY

This project was executed by following several steps for it to successfully achieve the project objectives. The flowchart of the steps is shown in Figure 1.

Fig. 1 Flowchart

Based on Figure 1, the first step of the project was initial discussion. The initial discussion elaborates on the background of the project, problem statement, objective of the project, scope of the project, and significance of the project. In initial discussion, other subjects regarding this project are also discussed, like the detail of the project, terms used in the project paper, problem that triggered the running of the project, limitations faced in this project, and the benefits of this project to the housing adverts sector. The second step was the literature review, where information and secondary data regarding the project were collected for a better understanding on VR technology field and its usage in housing advertising sector. Information and data were collected from research papers, journals, books, past theses, conferences, news, and also Internet websites. The information and data collected were reviewed for a better understanding and to support the research process. The third step was the process of developing VR adverts of a house developed by Amzed Development Sdn. Bhd. The development of the VR adverts required the use of a camera, Adobe Photoshop CS6, and Google Street View. The user can view the house when they watch the VR adverts. Meanwhile, the fourth step is the analysis on VR adverts which was done to identify the results and weaknesses of the VR adverts. Lastly, the final step included the conclusion of this project where the results and recommendations for future research of this project were conclude.

Data Collection

During the data collection process, two types of data were obtained, which is secondary data and data for VR advertisement development. The source of secondary data came from past research, articles, books, and journals. By using secondary data, the quotation of the origin of the data needed to be included in the project paper references. The information needed for quotation are author's name and year published. From the secondary data collected, information was retrieved for there search purpose in order to complete the project.

Then, the decision was

made based on the analysis of data and information. Hence, with the decision made, the development process of VR adverts could commence. The process of developing VR adverts in this project required the use of a smart phone camera, Adobe Photoshop CS6, and Google Street View. The camera was for taking digital photographs of the house. Even though other types of camera can also be used, the smart phone camera was the easiest to handle. Next, Adobe Photoshop CS6 software was used for editing and formatting the photo captured as it has the ability to stitch photographs. Then, Google Street View apps was use as the viewer platform since it is easily accessible and available for most smart phones and computers.

IV. ANALYSIS AND FINDINGS

Process of Developing VR Advertisement

The development of VR advertisement includes three steps and the steps need to be followed accordingly to avoid any problems during the development process. The flow of the process of developing the VR advertisement are in Figure2.
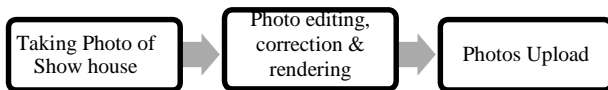

Fig. 2 Development Process

The first step of this developing process was taking the photo of the show house (Figure 3) in 360° format photo using Street View Camera and Panorama 360 application, which were installed in the smart phone. These applications have the ability to stitch photo- graphs and render it into a 360° format photograph.
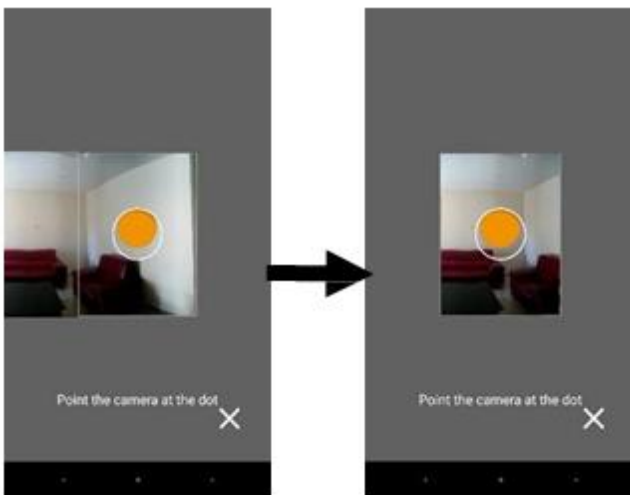

Fig. 3 Capturing photos of the house using Street View Camera

Next, the photographs were exported into the Adobe Photoshop CS6 for editing (Figure 4), correction, and rendering processes. Tools like Lasso tool, Stamp tool and Selection tool were used for the editing and correction processes. The title for each of the photographs were inserted using Text tool.
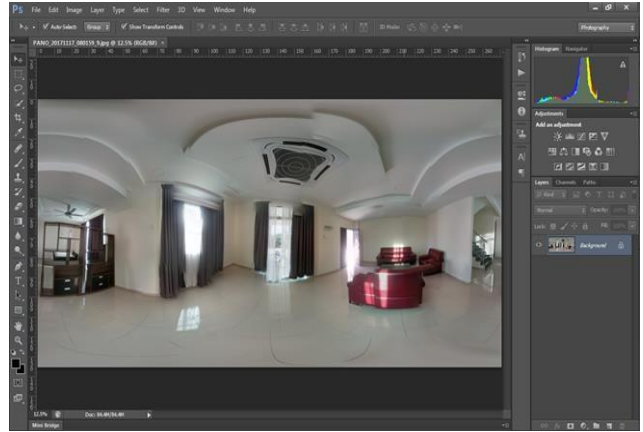

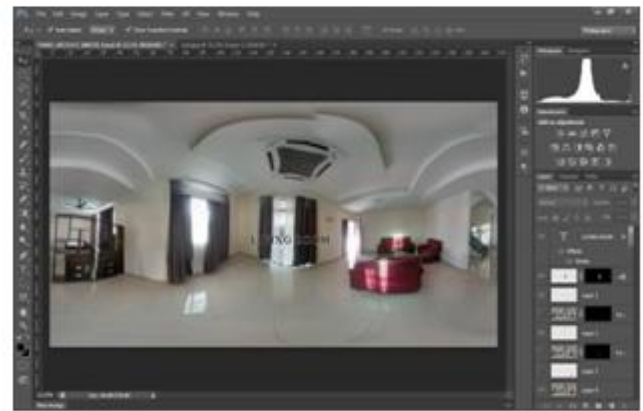**Fig. 4 Photo of the house before editing process**

Fig. 5 Photo of the house after editing process

After the editing process was completed (Figure5),the photos were rendered to .jpeg format with 360 metadata injected so it can be uploaded and viewed in 360o format. Lastly the photos were up- loaded into the Street View website using the Street View application. The photo can be viewed in smart phones and desktop computers by visiting the Google Maps website (Figure6)or launching the Street View apps (Figure7).

Fig. 6 VR advertisement through Google Maps website

Fig. 7 VR advertisement through Street View Apps

Findings

With the application of VR advertisement in housing advertising, the usage of paper-based advertisement material can be reduced, hence minimizing the cost of marketing. The usage of house model also can be reviewed since VR advertisement provides a better view and picture of the house for the customer to experience. The client and the house agent also would not need to travel to visit the show house, as this visit can be replaced by showing the VR advertisement, with the use of a VR headset for a full VR experience.

V. CONCLUSION AND DISCUSSION

The great potential applicability of VR in the housing market to allow customers to experience the view of house on the spot without having to visit the house is a great benefit. However, VR advertising also poses some threats and weaknesses to the housing company. Based on the research done, the main problem faced was the lack of skill and equipment among the housing companies for developing VR adverts for housing advertising. As the application of VR in advertising industry is still new, the resource of skilled workers for developing VR adverts is still quite low and limited, hence preventing the housing company to apply the use of VR in their housing advertising. To solve this problem, much research was done to find information and a suitable method to develop VR adverts. Many possible methods could be used to develop VR adverts, but some methods required a high-skill software and the use of expensive tools, like a 360° camera. For this project, a suitable and low-cost method was used to develop VR adverts. The selected method was as mentioned in the previous chapter, which was the use of a smart phone camera for taking photos of the house, Adobe Photoshop CS6 software for digital photograph editing, stitching, and rendering processes, and Google Street View app as the VR viewer platform. The objectives of this research were successfully achieved with the use of this method.

As are commendation, the result from using the show cased method produced simple VR adverts and the quality is no thigh. If the company wants high quality and professional VR adverts, a different method is needed, and high tech tools are to be used for developing the VR adverts. Another option was uncovered during the research process, where it was revealed that there are companies that provide the service of developing VR adverts for housing marketing, such as woob a VR. So, the housing company can hire these VR development companies and render their service to develop VR adverts for them.

As a conclusion, VR technology has the potential to change business models as it is predicted to be leading the changes in business processes and organisation of companies. VR is beginning to disrupt the housing industry because it is opening the door for technology companies to create VR viewings of homes that will enable prospective buyers all over the world to feel as if they are physically viewing a house. In this research, the process of developing VR adverts was quite challenging but through this process a lot of new information, knowledge, skills, and experiences were obtained. The result of these developed VR adverts was that the research objectives were achieved. Although some weaknesses were founded in VR adverts, it can be improved from time to time. Lastly, the developed VR adverts were a success as it is a new and revolutionary method of advertising houses in the housing industry. It will surely open a new window in the relationship of arising technology and property market.

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