

## THE INFLUENCE OF A COMBINATION OF VIRTUAL REALITY ON THE INTERNET AT EVERGRANDE REAL ESTATE GROUP

Tianyu Wang<sup>1</sup>, Suwatana Tungsawat<sup>2</sup>

Faculty of International College, Rajamangala University of Technology Krungthep, Thailand<sup>1,2</sup>

E-mail: [201953334@qq.com](mailto:201953334@qq.com)

**Abstract:** In recent years, there has been a growing tendency among businesses to use virtual reality (VR) to display their assets and the products they sell. When dealing with real estate, this method is innovative and on the cutting edge of the industry. It makes it easier for potential buyers to see the house in a new light. Furthermore, it streamlines the process of creating an educated decision about whether or not to buy the property by providing additional information about it. This study aimed to investigate the influence of virtual reality and the internet on the real estate sector. The study used a quantitative approach where 400 shareholders from Evergrande responded to the survey. The study found that the combination of virtual reality (VR) technology and the internet has already caused a positive revolution in the real estate industry and will continue to do so in the foreseeable future. Therefore, real estate agents and brokers must be knowledgeable about this technology to fully benefit from it and provide their customers with the highest level of service possible.

**Keywords:** *Quantitative, Real estate, Virtual Reality.*

Submitted: 2023-04-11; Revised: 2023-06-19; Accepted: 2023-06-20

---

### 1. Introduction

Businesses have had to adopt integrated systems and processes to cut costs and improve information exchange to boost productivity. Pulles and Schiele (2016) define technical innovations as creating better products or services that fulfill customers' wants and exploring new market sectors to increase customer satisfaction. Technological advancements are essential for addressing diverse client needs, staying competitive, and boosting performance, according to Ettlie and Rosenthal (2014). Nemati, Khan, and Moazzar examined Pakistani mobile phone performance and technological progress in 2010. Their relationship was solid. Folarin and Zubair (2015) found a significant association between performance and technological innovation in their Malaysian Tesco retail store study. Tesco retail locations' technological advances saved money and enhanced productivity. Ameme and Wikero (2016) examined Ghanaian commercial bank performance and technology developments. Technology improved commercial banks' efficiency, convenience, and cost savings. Commercial banks' continual technological investments enhanced client happiness and performance. In their 2018 study on the factors affecting ICT growth in Nigerian real estate, Oyetunji, Ojo, and Olakunmi found that technological infrastructure, service delivery efficiency, and productivity branding all enhanced ICT use in Lagos. In his study on ICT adoption in Malawian real estate, Olu (2018) found that building technology and electronic marketing considerably decreased construction, operational, and marketing expenses.

Virtual reality's usefulness in business has led to substantial independent research. Nonetheless, certain areas are unexplored. Virtual reality was studied in the above studies. Internet and virtual reality effects on the real estate industry were never considered. This technology aids several fields. However, it has not been studied in real estate. So, virtual reality's real estate business benefits are unclear. Despite its extensive study, no real estate research has been done on virtual reality. This paper can cover many aspects because virtual reality has not been substantially investigated. Businesses are increasingly using VR to showcase their assets and offerings. VR has three types: Virtual reality (VR) offers several benefits, including a realistic and immersive experience that is hard to recreate using photos and films. Virtual reality has grown in popularity due to these benefits. VR is increasing in popularity due to these benefits. Evergrande, China's largest and most successful real estate developer, has capitalized on this trend. Evergrande has marketed domestic and international real estate via VR. They created a virtual reality (VR) program that lets customers see a property in many settings, such as an internal garden or a beach villa, before buying.

This real estate technique is cutting-edge. It helps purchasers see the house differently. Offering more information simplifies making an informed decision about buying the property. Evergrande can now sell properties abroad more easily. China's strong economy attracts foreign buyers of real estate. China is the world's second-largest real estate market after the US. Evergrande can advertise its products and real estate listings using virtual reality (VR), an effective advertising method. Businesses looking to boost sales and attract new clients may choose it. Its many advantages over conventional methods make it better. This study solely uses Evergrande, which may not truly reflect how virtual reality and the internet affect real estate. The study's unmonitored online questionnaires may bias respondents. These insights should be applied to other industries. Banking, with its fierce competition, may be significant too. This summarizes relationship categories found during an examination. Innovative technologies improve productivity, cost, and value. Future academics must study how technological advances affect competitive advantage.

## **2. Review of Related Literature**

### ***Technology in real estate***

Real estate marketing before the Internet relied on print ads, brokerages, and word-of-mouth. Sellers needed real estate agents to find buyers, while buyers had problems finding properties that fit their needs (Shaw, 2018). The Internet revolutionizes everything. Sellers can list their properties on MLS, and purchasers can search online using keywords. Technology makes finding and contacting buyers easier for real estate brokers (Shaw, 2018). Today, brokerages provide agents with automatic email capabilities to notify buyers daily or weekly. Many MLSs include apps that help users search for properties by area, kind, price range, or other criteria (Fields & Rogers, 2019). Real estate agents can now swiftly find new clients and assist them in finding a house at the correct price. However, real estate technology marketing has drawbacks. Agents may have problems using these things (Fields & Rogers, 2019). Any property they enjoy may necessitate learning new software or platforms. Monitoring many listings and working with clients and technology can be distracting (Fields & Rogers, 2019). Technology has revolutionized real estate marketing by simplifying buyer-seller matching and negotiation.

VR has existed in various versions for ages. 1800s inventions include panoramic paintings, View-Masters, and VR toys (Anthes et al., 2016). Morton Heilig created Sensorama in the 1960s. The user's experience was improved by this device's ability to

reproduce odors, noises, and movement (Zhan et al., 2020). 1970s inventor Ivan Sutherland created the first head-tracking virtual reality headset (Wang et al., 2018). Unfortunately, early VR headsets were hefty and needed powerful computers. This limits virtual reality gaming. In the late 1990s, firms created cheaper, simpler VR headsets (Ullah et al., 2017). Since these headsets work with more inexpensive computers, recreational VR use may expand. VR's popularity has surged due to affordable, high-quality VR headgear and vast content. It's appealing for these reasons. Gaming, healthcare, education, and marketing use VR (Anthes et al., 2016). Virtual reality has many uses but an uncertain future. Yet, virtual reality has many exciting applications.

### ***Virtual Reality and Augmented reality***

VR immerses users in simulated worlds (Billinghurst et al., 2015). AR's digital overlays make it less immersive. AR and VR are distinct (Billinghurst et al., 2015). AR is for navigation and information, whereas VR is for games and simulations (Zhan et al., 2020)—experience VR. AR devices project digital data into reality. AR lacks VR immersion (Wang et al., 2018). AR may cost cheaper than virtual reality and require less gear (VR). Nevertheless, AR/VR is useful. Medical, gaming, and training simulations employ VR. Navigation, advertising, and product demos utilize AR (Yun-Han et al., 2019). VR and AR will gain popularity as they get cheaper and more immersive (Yun-Han et al., 2019). Virtual and augmented reality are used differently. 2022 AR will be \$209.2 billion. Wang, coworkers (2018). Despite this optimism, augmented reality technology remains tricky. Tech must overcome several challenges to succeed (Wang et al., 2018). Augmented Reality's biggest challenge is equipment expense. The HoloLens costs \$3,000. Al (2021). This deters most customers. Without user interaction, creating augmented reality content requires pricey software like Unity or Unreal Engine (Ullah et al., 2017). Few try AR, but most want to (Wang et al., 2018). Third, AR users must interact with the virtual world to improve usability. AR headsets don't allow solo virtual exploration (Yin et al., 2021). Technology requires skilled advice. Problems have various solutions. First, tech companies may lower AR headset prices (Xiong et al., 2021). This simplifies AR testing. Virtual and augmented reality enterprises may offer prospective clients virtual tours (Xiong et al., 2021). Consumers, businesses, and software developers must solve these issues collectively (Wang et al., 2018). These efforts may improve virtual reality.

### ***Application of VR in different sectors***

VR shows items. VR lets organizations develop realistic 3D environments where customers may interact with products (Farshid et al., 2018). This enables people to imagine a product without touching it. VR allows pre-purchase product testing (Pleyers & Poncin, 2020). This helps transport and store aviation parts. VR lets buyers explore fashion and real estate areas (Zhan et al., 2020). This helps companies understand their target market's needs and improve product development. VR can also give fashion and real estate purchasers a different perspective than photographs or movies (Wang et al., 2018). VR can be used in many industries (Pleyers & Poncin, 2020). VR presents products more realistically and improves the client experience. VR may aid education. Traditional training methods are laborious and time-consuming (Wang et al., 2018). Virtual reality technology allows users to explore new places and situations without leaving home (Ullah et al., 2017). This makes training more authentic and effective. Virtual reality could be used in medicine (Farshid et al., 2018). Doctors must examine patients from many angles. Virtual reality (VR) technology

may assist them in avoiding the time-consuming procedure of creating a patient model (Farshid et al., 2018), save time, and improve patient care.

AR and VR technology were early adopters in real estate. AR and VR make property visualization possible (Deaky & Parv, 2018). Real estate agents use AR to show buyers how a property would look with certain furniture or fixtures (Ganapathy, 2016). It helps people choose a property's size. Agents use VR to show buyers a property from different angles. This can help people imagine the property in their lifestyle (Shaw, 2018). AR and VR enhance real estate. Ganapathy (2016) claims this simplifies property selection. It's also changing property buyers' minds. This may encourage some to participate and buy property. VR and AR are changing the real estate industry by making it easier for customers to browse and buy properties (Ozacar et al., 2017). Buying real estate used to require visiting the area (Deaky & Parv, 2018). VR and AR allow users to view virtual copies of properties worldwide (Farshid et al., 2018). Augmented reality can also create photorealistic building renderings on any surface (Billinghurst et al., 2015). This makes it easy for homebuyers to see how a house looks in different settings and understand its layout. Real estate firms also benefit from VR. It can help buyers visualize properties differently, making better decisions (Deaky & Parv, 2018). Virtual reality can also provide immersive real estate tours, assisting buyers in imagining the product (Farshid et al., 2018). Finally, videos and online ads can use VR and AR to market real estate.

### **3. Research Method**

This study section discusses the approaches, strategies, and procedures applied in the research process. This section begins its explanation of the research process by discussing the methodological considerations involved in the research process. This chapter contains a summary that is only partially comprehensive, as well as information about test locations, test methods and scales, data collection strategies, and data analysis procedures.

#### ***Research Process***

Quantitative research accomplished the study's purpose. Quantitative research uses objective scientific model approaches, standards, and social realities (Bryman & Bell, 2007). Quantitative analysis involves collecting numerical data to separate factors for research (Creswell, 1994). Data came from descriptive computerized surveys. This study uses descriptive research to examine virtual reality and the Internet's impact on real estate. 400 computerized Evergrande tenant and employee surveys were reviewed. In study populations' surveys, structured and open-ended questions were customized (Sweney, 2009). This study used descriptive quantitative questionnaires to acquire data from its primary population (Ching et al., 2015). 418 people took the survey. SPSS analyzes quantitative data converted from qualitative data. It uses induction. This technique incorporates new findings. Due to its history and ability to acquire tiny qualitative data samples, the induction technique was chosen. However, induction's fundamental weakness is drawing significant conclusions from a few observations. The investigations are, therefore, unreliable (Denzin & Lincoln, 2005).

#### ***Population and Sample Size***

Participants were eligible for the study if they met one of the following criteria: they had prior work experience in the Evergrande real estate company; they are current or prospective tenants of an Evergrande property; they plan to rent or buy a living space from the company shortly; or they had previously worked in the Evergrande real estate company. Evergrande personnel were also eligible to participate in the survey because the goal was to evaluate the

influence of virtual reality and the internet on the real estate industry. The study aimed to examine virtual reality and the internet's impact on the real estate sector. The recommended technique for this study was shared on Evergrande's websites and emails. Because we do not know the exact population, thus used the Cochran formula, which resulted in 384.16 samples. To prevent possible errors during questionnaire collection, the sample size was increased by 10% to 400; 418 surveys have been completed and returned. The research used the formula:

$$n = Z^2/4e^2$$

Where:

- n is the sample size
- Z is the normal standard deviation (e.g., 1.96 for a 95% confidence level)
- e is the desired level of precision or margin of error (e.g., 0.05 for 5% precision)

Formula for substitution n yields the following results

$$n = (1.96)^2/4(0.05)^2$$

$$n = 0.9604/0.0025$$

$$n = 384.16 \approx 385$$

### ***Research Instrument***

This investigation was quantitative. Only primary data from respondents were analyzed. 418 participants completed the questionnaires. Data analysis uses quantitative methods like SPSS. Internet surveys could gather the data. The researcher collected data via email questionnaire. We will also use Internet phone interviews and email surveys due to the respondents' distance from us. Evergrande employees and tenants received 418 digital questionnaires. 400 completed questionnaires were assessed. The demographic questionnaires were open-ended and organized. This section analyzes descriptive data related to the study's goal. Descriptive statistics summarize important trend data and critical indicators. Frequency in statistics is how often something happens. Frequency analysis examines variance, percentiles, and other frequency-related data (frequency). Frequency analysis solves both investigations' problems. Frequency analysis measures how often each respondent responds.

Cronbach's alpha evaluated survey questionnaire validity and connectivity. Cronbach's alpha compares tests and scales (Cronbach, 1954). Hence, Cronbach's alpha assesses a degree's perceived consistency. Devices may get noticed with high alpha prices. Low alpha indicates a short test. Poor scores can result when a few buried parts have strength unrelated to the testing equipment. A degree's dependability is measured from 0 to 1. If more variables have the same covariance, the coefficient is more important. A critical degree has minimal to no random size error, which introduces random bias into measurement and makes consistent results difficult (Chelsea, 2015). From 0 to 1, the dependability coefficient denotes a degree's general reliability.

The coefficient is more important if more variables have the same covariance and are likely to judge the same underlying impression. However, an essential degree has little to no random size error, which brings random bias into the measurement procedure and makes consistent conclusions impossible (Chelsea, 2015). The Cronbach's alpha of the main variables areas shown below which were all above 0.7:



**Table 1. Reliability Statistics**

<b>Variables</b>	<b>Virtual reality</b>	<b>People Decision making</b>	<b>Easy Access and Distribution of Property</b>	<b>Easy Communication and Marketing</b>
<b>Cronbach alphas coefficient</b>	<b>0.892</b>	<b>0.914</b>	<b>0.917</b>	<b>0.914</b>
<b>ITEM</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>

According to Benesty et al. (2009), statistics use correlations to demonstrate the relationship between two quantitative variables. The linear relationship becomes stronger or weaker as one unit expands or contracts; one variable expands or contracts by a certain amount. The correlation coefficient, also known as the Pearson correlation coefficient, is a linear correlation metric used since its inception to assess the strength of relationships. Other, more difficult correlation methods must be used to demonstrate the relationship with a curve. Pearson's bivariate correlation yields  $r$ , indicating the strength and direction of a linear relationship between two continuous variables. This section discusses the correlation analyses performed for the study.

#### **4. Results and Discussion**

##### **4.1. Results**

It covers only the results and analysis of the quantitative results, the results and analysis of the qualitative results, and the building of questionnaires. When relevant, these findings are also reviewed in light of previous research and existing literature to determine the parallels and contrasts between the results of this study and those of earlier research and literature. A total of 418 questionnaires were distributed, and 400 questionnaires were returned and screened. The bare statistics table shows that 199 (49.8%) were female and 201 (50.2%) were male; the majority of the respondents were aged 20-40, with 207(66.7%); the majority of the respondents had a college or university degree, with 390 (97.5%); The income distribution is Above 4000 yuan, with 380 people, accounting for 95.0% of the total. See the table below for details. Since the theme of this study is to study the influence of the combination of virtual reality and the internet on the real estate sector, in terms of information data analysis influencing factors, this study is mainly from virtual reality, value and attitude, people's decision making, easy access and distribution of property, accessible communication and marketing, and expressed by mean and standard deviation, as follows:

**Table 2 Average value and standard deviation of influencing factors refer to opinion level:**

<b>Variables</b>	<b><math>\bar{X}</math></b>	<b>S.D.</b>	<b>Opinion level</b>
1. Virtual reality	4.501	0.441	important
2. People Decision making	4.547	0.452	important
3. Easy Access and Distribution of Property	4.546	0.463	important
4. Easy Communication and Marketing	4.340	0.460	important
Total	4.498	0.454	important

Table 2 found that overall influencing factors were average at the high-level(  $\bar{X}$  =4.498, S.D.=0.454). If considering each aspect in descending order, it was found that People Decision making had the highest mean (  $\bar{X}$ =4.547, S.D.=0.452), followed by the value and attitude (  $\bar{X}$ =4.546, S.D.=0.463) and value and attitude (  $\bar{X}$ =4.501, S.D.=0.441) Respectively. Information data analysis and research on factors affecting and influencing factors, including Virtual reality, People Decision making, Easy Access and Distribution of Property, Easy Communication, and Marketing, and presented by mean and standard deviation, as shown in Table 3 to Table 4-6.

**Table 3. Average value and standard deviation of Virtual reality factors refer to opinion level:**

<b>Virtual reality</b>	<b><math>\bar{X}</math></b>	<b>S.D.</b>	<b>Opinion level</b>
1. Virtual reality makes me focus on real estate	4.435	0.686	very important
2. Virtual reality will make it easier for me to rent	4.513	0.579	very important
3. Virtual reality shows the whole picture of the future house	4.516	0.579	very important
4. Virtual reality makes me think better	4.536	0.533	very important
5. Virtual reality makes me feel even more interesting	4.536	0.586	very important
Total	4.510	0.592	very important

Table 3. found that overall influencing factors were average at the high-level (X =4.510, S.D.=0.592). If considering each aspect in descending order, it was found that Virtual reality makes me feel even more interesting had the highest mean (X=4.536, S.D.=0.586), followed by the value and attitude (X=4.536, S.D.=0.533) and value and attitude (X=4.513, S.D.=0.579) Respectively.

**Table 4. Average value and standard deviation of People Decision making refer to opinion level:**

<b>People Decision making</b>	<b><math>\bar{X}</math></b>	<b>S.D.</b>	<b>Opinion level</b>
1. The combination of virtual reality and the Internet in real estate allows me to make decisions faster	4.495	0.624	very important
2. The combination is bringing positive influence in the real estate sector	4.573	0.495	important
3. I prefer the introduction of salesmen in the virtual world	4.553	0.497	important
4. The combination of VR has made decision-making easier in the real estate sector	4.560	0.501	very important
5. The combination of VR saves me money	4.555	0.517	very important
Total	4.547	0.527	very important

Table 4 found that overall influencing factors were average at the high-level(  $\bar{X}$  =4.547, S.D.=0.527). If considering each aspect in descending order, it was found that The

combination of VR saves me money had the highest mean ( $\bar{X}=4.573$ ,  $S.D.=0.495$ ), followed by the value and attitude ( $\bar{X}=4.560$ ,  $S.D.=0.501$ ) and value and attitude ( $\bar{X}=4.495$ ,  $S.D.=0.624$ ) Respectively.

**Table 5. Average value and standard deviation of Easy Access and Distribution of Property refer to opinion level:**

Easy Access and Distribution of Property	$\bar{X}$	S.D.	Opinion level
1. The combination improves the services real estate firms provide to their clients	4.480	0.648	very important
2. The combination has improved marketing in the real estate sector	4.553	0.517	very important
3. The combination has brought about improved innovation in the real estate sector	4.553	0.512	very important
4. The Combination has improved the access and distribution of properties in the real estate sector	4.560	0.511	very important
5. The convenient property service makes me more comfortable	4.583	0.503	very important
Total	4.546	0.538	very important

Table 5 found that overall influencing factors were average at the high-level ( $\bar{X}=4.546$ ,  $S.D.=0.538$ ). If considering each aspect in descending order, it was found that The convenient property service makes me more comfortable had the highest mean ( $\bar{X}=4.583$ ,  $S.D.=0.503$ ), followed by the value and attitude ( $\bar{X}=4.560$ ,  $S.D.=0.511$ ) and value and attitude ( $\bar{X}=4.553$ ,  $S.D.=0.517$ ) Respectively.

**Table 6. Average value and standard deviation of Easy Communication and Marketing refer to opinion level:**

Easy Communication and Marketing	$\bar{X}$	S.D.	Opinion level
1. VR gives me up-to-date information on real estate	4.365	0.626	very important
2. VR always shows me the product	4.430	0.498	very important
3. VR can be customized according to my location	4.445	0.504	very important
4. VR can always communicate with me	4.375	0.498	important
5. The combination provides customers with a clearer picture of the product they are purchasing	4.378	0.490	important
Total	4.399	0.571	very important



Table 6 found that overall influencing factors were average at the high-level(  $\bar{X}$  =4.399, S.D.=0.571). If considering each aspect in descending order, it was found that The combination provides customers a clearer picture of the product they are purchasing had the highest mean (  $\bar{X}$ =4.445, S.D.=0.504), followed by the value and attitude (  $\bar{X}$ =4.430, S.D.=0.498) and value and attitude (  $\bar{X}$ =4.378, S.D.=0.490) Respectively.

### Hypothesis verification

Concerning the hypothesis test of "the influence of the combination of virtual reality and the internet on the real estate sector," the researchers preliminary analyzed the correlation between the Multicollinearity of factor values (based on VIF) and independent variables by using the product-moment correlation method. Through the multiple regression analysis of the hypothesis of "the influence of the combination of virtual reality and the internet on the real estate sector," the specific independent variables are demonstrated as follows:

**H0:** The combination of virtual reality and the internet has no impact on the real estate sector

**H1:**the combination of virtual reality and the internet has an impact on the real estate sector

The research results on the correlation between independent variables of “the influence of the combination of virtual reality and the internet on the real estate sector” are shown in the following Table 7.

**Table 7. The correlation between independent variables**

	X1	X2	X3	X4
X1	1	.917**	.949**	.917**
X2	.917**	1	.847**	1.000**
X3	.949**	.847**	1	.847**
X4	.917**	1.000**	.847**	1

\*\*. Correlation is significant at the 0.01 level (2-tailed)

As determined by the researchers in table 4.7, "the influence of the combination of virtual reality and the internet on real estate sector," the independent variable factors as four dimensions: virtual reality, value and attitude, people decision making, easy access and distribution of property, easy communication and marketing. It positively impacts the "real estate sector," and the correlation coefficient can reach between 0.847 and 1.000. It shows that the correlation between their variables is at a significant level of 0.01.

Regression analysis refers to the use of statistical principles, the mathematical processing of a large number of statistical data, and to determine the correlation between the dependent variable and certain independent variables, to establish a good correlation regression equation (function expression), and extrapolation, used to predict future changes in the dependent variable analysis method. According to the number of dependent and independent variables, the analysis is divided into univariate and multiple regression analysis; according to the functional expression of the dependent variables and independent variables, the analysis is

divided into linear and non-linear regression analysis. In "The influence of the combination of virtual reality and the internet on the real estate sector," the correlation between independent variables of the combination of virtual reality and the internet impacts the real estate sector, and institute using the multivariate regression coefficient method is studied. The use of into the way to all independent variables set into the same formula, it is concluded that multivariate regression coefficient, specific analysis of the results shown in table 8 below:

**Table 8. Linear regression analysis results (n=30)**

	Non-standardized coefficients		Standardisation factor	$t$	$p$	VIF
	$B$	Standard error	Beta			
<b>Constants</b>	-0.984	0.599	-	-1.643	0.113	-
X1	0.294	0.262	0.353	1.122	0.273	4.771
X2	0.16	0.234	0.194	0.685	0.5	3.876
X3	0.002	0.214	0.002	0.009	0.993	3.302
X4	0.16	0.234	0.194	0.685	0.5	3.876
$R^2$	0.48					
AdjR <sup>2</sup>	0.397					
$F$	$F(4,25)=5.778, p=0.002$					
D-W value	2.006					

From the above table 8, it can be seen that linear regression analysis was conducted with X1, X2, X3, and X4 as the independent variables and position as the dependent variable. The above table shows the model equation: position = -0.984 + 0.294\*X1 + 0.160\*X2+ 0.002\*X3+ 0.160\*X4 and the model R-squared value is 0.480, implying that X1, X2, X3, X4 can explain 48.0% of the variation in position. An F-test of the model revealed that the model passed the F-test ( $F=5.778$ ,  $p=0.002<0.05$ ), which means that at least one of X1, X2, X3, and X4 would affect the position. Values are around the number 2, thus indicating that the model is not autocorrelated. There is no correlation between the sample data and the model is good. The final specific analysis shows that

The regression coefficient value for X1 is 0.294 ( $t=1.122$ ,  $p=0.273>0.05$ ), implying that X1 does not impact position.

The regression coefficient of X2 is 0.160 ( $t=0.685$ ,  $p=0.500>0.05$ ), which means that X2 does not affect the position.

The regression coefficient for X3 is 0.002 ( $t=0.009$ ,  $p=0.993>0.05$ ), which means that X3 does not affect the position.

The regression coefficient for X4 is 0.160 ( $t=0.685$ ,  $p=0.500>0.05$ ), which means that X4 does not affect the position.

To summarise the analysis, it can be seen that X1, X2, X3, and X4r all do not affect the position.

Through the study of the correlation between the four independent variables, it is found that the factor value (VIF) is between 3.302 and 4.771, and its value is less than 10, indicating that there is no multicollinearity between the independent variables.

The F-test is used to test whether the regression model is meaningful.

First: if the model passes the F-test ( $p < 0.05$ ), it means that the model is meaningful and at least one of the X's will affect Y.

Second: if the model does not pass the F-test ( $p > 0.05$ ), it means that the model construction is not meaningful, and none of the X's will have an effect on Y.

From the table above, the model was found to pass the F-test ( $F = 5.778$ ,  $p = 0.002 < 0.05$ ) when tested, meaning that the model construction is meaningful.

#### **4.2. Discussion**

From this study, the results of the data analysis in the previous section show that the combination of virtual reality and the internet has an impact on the real estate sector; the emergence of new technologies always has an impact on the real estate market. The internet has drastically changed how properties are marketed and sold and how consumers search for information about potential purchases. Virtual reality (VR) is the latest technology to impact the real estate market, and it can potentially change how properties are marketed, sold, and even designed and built. A VR system can give potential buyers a realistic, three-dimensional experience of their desired properties. This can allow them to see the property from all angles and feel as if standing inside it. VR systems can also be used to create virtual tours of properties for sale, which can help potential buyers visualize how the property would look in their home.

The internet has had a significant impact on both how people work and live. In addition to this, it has had a significant impact on the real estate industry. People can view real estate from anywhere in the world thanks to virtual reality (VR) technology and the internet. Because of this, purchasing and selling property is now much less complicated and more time-effective. In addition, people can search for properties online using specific criteria like price, location, and amenities. This was not possible before the advent of the internet. The combination of virtual reality (VR) technology and the internet has already caused a revolution in the real estate industry and will continue to do so in the foreseeable future. Real estate agents and brokers need to be knowledgeable about this technology to fully benefit from it and provide their customers with the highest level of service possible. The Internet and VR innovation have drastically improved the real estate sector. Social media marketing was discovered to have a significant impact on performance. According to the respondents, social media marketing provided easy access to information for businesses and customers, served as a platform for marketing, particularly the sale of real estate, and allowed for customized customer feedback.

##### ***Information Sharing***

Results show that VR and the internet have improved real estate information sharing. Tablets and smartphones enable agency-client communication. Thanks to technology and digital improvements, they can also creatively display facts to potential clients or tenants. Visual tours of real estate listings can enhance the portfolio. Video ads are increasingly gaining popularity, especially on Facebook and YouTube, where viewers may press "play" to see them (Hugel, 2017). New technology can help agencies compete and improve listing visibility. Hence, technology has transformed real estate agencies and client relations. New technology and workflows impress clients and put agencies ahead of their competitors. Improved information exchange could help real estate business owners and clients. Owners/agents no longer have to spend big money on marketing activities like TV, magazine, and newspaper ads, which raise property prices. Customers buy less when these costs are passed on. Real estate firms have embraced social media to advertise their products and

services and provide 24/7 customer support since their rise (Aytekin & Demirli, 2017). The platforms offer low-cost tours of buildings and services. Technological technologies have made communicating and sharing information easier for customers and real estate brokers. This helps buyers and renters make educated decisions.

On Facebook and Twitter, potential, new, and present customers discuss properties, what they want, and the market. Formerly, only a few exchanged information, keeping others in the sector in the dark. Consumers can readily communicate information without real estate agents. This reduces middleman abuse. Virtual reality (VR) and augmented reality (AR) allow prospective buyers to visually tour units under development or completed worldwide, making it easier to share information (Kim, 2015). In the traditional real estate market, clients cannot imagine a house unless they see it. Physical visits make home pre-sales harder and slower. AR and VR show customers the finished product. This helps the product look more authentic and boosts sales. It also accelerates home sales. Real-time technology like the Samsung Gear VR Virtual Reality headset lets real estate developers show potential customers how their homes are progressing and how they will look when finished (Deaky and Parv, 2017).

### ***Marketing and Improved Communication***

According to the study, VR and the internet have boosted Evergrande's real estate marketing and communication. Real estate involves people; therefore, communication is crucial. Thanks to technology, clients and real estate firms may connect more efficiently. Customer care reps now use emails and online contact forms instead of phone calls and in-person interactions. Once upon a time, customer care professionals wasted time on phone tags or in-person meetings (Nakajo et al., 2014). Real estate offices, listings, and agent's contact information are now easily accessible to customers. Communication has improved due to web listings.

Most real estate firms flourish using distant network techniques. This has reduced staff office space and changed the best location. Technology has made property inquiries unnecessary for clients. Before these advancements, a real estate company's location was a significant factor in its performance and ability to compete. Famous buildings and avenues in several cities charged expensive leases. Communication has made real estate firms' physical sites less critical. Real estate companies need less office space and use it differently due to technological advances. Mobile and social media enable property information sharing fast and cheaply. Online leasing deals are likely. Clients may quickly investigate agents and houses before hiring them. The agent clarifies with the client and agent before starting the complicated buying or renting process. Good communication and images eliminate the need for purchasers to call real estate firms about listing concerns. First communication may aim to schedule a viewing (Hügel, 2017). So buyers don't have to contact organizations about the property's initial issues. Consumers can research appealing properties. Real estate agents can offer local market and property advice with better communication. They'll sell. Customers' unprecedented information availability creates this potential. Direct business between individuals has never been accessible, even with communication technology. Hügel thinks real estate is risky (2017). Most corporations naturally undermine peer-to-peer and limit listing information. Satisfied customers and quality services are excellent. Even if the agent sells peer-to-peer, clients will use the business. Communication advances are turning brokers into advisors. Most purchasers can now afford homes, expanding the market.

### ***Easy Access and Distribution of Properties***

The results show that VR and the internet simplify property distribution. Building workers and buyers are connecting via virtual reality, interactive internet, and augmented reality. New cloud-based finance solutions help close this gap. Low-income housing is mostly mid- to high-rise buildings with small units built using inexpensive materials and insufficient technology to make construction efficient and cost-effective, so purchasers pay less (Peterson, 2015). Modern economical housing combines prefabricated pieces and cheap materials to build excellent homes on a budget. Real estate corporations formerly sold the land. Slow, manual activities that required plenty of documentation occupied most of the staff. Due to technology, real estate websites and smartphone apps with virtual reality tours and additional information from internet databases have replaced newspaper ads and other forms of promotion (Nappi- Choulet and Ribeiro, 2018). Customers can visit new and old homes using virtual reality. Developers use this technology to show potential buyers the property virtually. Real-time technologies and devices allow developers to sell completed and under-construction homes. Potential clients can explore the site before construction using virtual reality. Real estate is easier to buy and sell with technology. Unit availability and distribution depend on real estate transaction information. Property sales accelerate with honesty. Fintech lenders use better, faster, and more information-rich technologies to improve business for everyone (European Real Estate Society, 2018). Enodo and other AVMs have made home purchasing and selling easier (European Real Estate Society, 2018).

### **5. Conclusion**

The report suggests real estate firms adjust their strategy to the global market and incorporate Internet innovation into their core operations. As a result, they will make more money by increasing their market. First, real estate companies must arrange their marketing teams before adopting social media. After examining target markets and segment-targeted marketing, they might arrange their social media platforms. Staff must be tech-savvy and social media-savvy to use these platforms to improve marketing plans. Second, web marketers in real estate must adapt to customer needs. To match deliverables and requirements, the client and developer must communicate simply, and swiftly. This avoids miscommunication, leading to arguments, unhappy customers, and failed projects.

Real estate brokerages must set up an escrow account with the customer, bank, independent evaluators, and developer to ensure contract compliance and consumer satisfaction. Third, real estate companies must invest in ongoing training and development to keep employees current. As employees learn more, operational procedures, service delivery efficiency, and process and procedure clarity will improve. Fourth, real estate enterprises must adapt their operating methods to new technology to compete. Finally, corporations must invest heavily to grow and enhance operations. This ensures real estate firms use cutting-edge techniques to satisfy global standards. For example, precast concrete panels and other building technology could help real estate companies save on construction expenses. As a result, building projects may endure longer using these materials. Real estate companies should prioritize R&D and study ten technical trends. Companies can still provide value to clients without using fake or low-quality precast and prefabricated materials. Based on this research, future research should explore the use of virtual reality in the real estate industry more broadly, compare Evergrande's results with those of other companies in the industry, conduct a long-term study to determine VR's effectiveness in increasing sales and customer



satisfaction over time, and investigate the potential barriers to VR's widespread adoption in the industry and develop strategies to overcome them.

## References

- Ameme, B., & Wikero, J. (2016). Impact of technological innovations on customer retention in the banking sector in Ghana. *The Business and Management Review*, 7(3), 20-24.
- Anthes, C., Garcia-Hernandez, R. J., Wiedemann, M., & Kranzlmuller, D. (2016). State of the art of virtual reality technology. *2016 IEEE Aerospace Conference*. <https://doi.org/10.1109/aero.2016.7500674>
- Aytekin, Ç., & Demırlı, S. M. K. (2017). The role of social media in Real Estate marketing: A research on the transformation of Real Estate marketing in Turkey. *Öneri Dergisi*, 12(48), 17-36.
- Billinghurst, M., Clark, A., & Lee, G. (2015). A Survey of Augmented Reality. *Foundations and Trends® in Human-Computer Interaction*, 8(2-3), 73–272. <https://doi.org/10.1561/11000000049>
- Cronbach, L. J. (1954). Report on a psychometric mission to Clinicia. *Psychometrika*.
- Deaky, B. A., & Parv, A. L. (2018). Virtual Reality for Real Estate – a case study. *IOP Conference Series: Materials Science and Engineering*, 399, 012013. <https://doi.org/10.1088/1757-899x/399/1/012013>
- Deaky, B. A., & Parv, L. (2017, June). Virtual Reality for Real Estate: Its evolution in Bluemind Software. In *2017 4th Experiment@ International Conference (exp. at'17)* (pp. 83-86). IEEE.
- Farshid, M., Paschen, J., Eriksson, T., & Kietzmann, J. (2018). Go boldly!: Explore augmented reality (AR), virtual reality (VR), and mixed reality (MR) for business. *Business Horizons*, 61(5), 657–663. <https://doi.org/10.1016/j.bushor.2018.05.009>
- Fields, D., & Rogers, D. (2019). Towards a Critical Housing Studies Research Agenda on Platform Real Estate. *Housing, Theory and Society*, 38(1), 1–23. <https://doi.org/10.1080/140036096.2019.1670724>
- Ganapathy, A. (2016). Virtual Reality and Augmented Reality Driven Real Estate World to Buy Properties. *Asian Journal of Humanity, Art, and Literature*, 3(2), 137–146. <https://doi.org/10.18034/ajhal.v3i2.567>
- Gianiodis, P. T., Ettlie, J. E., & Urbina, J. J. (2014). Open service innovation in the global banking industry: Inside-out versus outside-in strategies. *Academy of Management Perspectives*, 28(1), 76-91.
- Kim, A. M. (2015). Sidewalk city. In *Sidewalk City*. University of Chicago Press.
- Nakajo, S., Mori, N., Yasuda, T., & Mase, H. (2014). Global stochastic tropical cyclone model based on principal component analysis and cluster analysis. *Journal of Applied Meteorology and Climatology*, 53(6), 1547-1577.
- Nappi-Choulet, I., & de Campos Ribeiro, G. (2018). *New technology and new data in Real Estate* (No. eres2018\_86). European Real Estate Society (ERES).
- Oyetunji, A. K., Ojo, B., & Oyetunji, B. O. (2018). Factors influencing the deployment of ICT in Nigerian real estate practice. *Journal of African Real Estate Research*, 3(1), 1-20.
- Ozacar, K., Ortakci, Y., Kahraman, I., Durgut, R., & Karas, I. R. (2017). A LOW-COST AND LIGHTWEIGHT 3D INTERACTIVE REAL ESTATE-PURPOSED

- INDOOR VIRTUAL REALITY APPLICATION. *ISPRS Annals of Photogrammetry, Remote Sensing and Spatial Information Sciences*, IV-4/W4, 307–310. <https://doi.org/10.5194/isprs-annals-iv-4-w4-307-2017>
- Pleyers, G., & Poncin, I. (2020). Non-immersive virtual reality technologies in real estate: How customer experience drives attitudes toward properties and the service provider. *Journal of Retailing and Consumer Services*, 57, 102175. <https://doi.org/10.1016/j.jretconser.2020.102175>
- Pulles, N. J., Schiele, H., Veldman, J., & Hüttinger, L. (2016). The impact of customer attractiveness and supplier satisfaction on becoming a preferred customer. *Industrial marketing management*, 54, 129-1400.
- Rudestam, K. E., & Newton, R. R. (2015). Literature review and statement of the problem. *Surviving your dissertation: A comprehensive guide to content and process*, 69-81.
- Sanders, A., Elangeswaran, C., & Wulfsberg, J. P. (2016). Industry 4.0 implies lean manufacturing: Research activities in Industry 4.0 function as enablers for lean manufacturing. *Journal of Industrial Engineering and Management (JIEM)*, 9(3), 811-833.
- Shaw, J. (2018). Platform Real Estate: Theory and Practice of new urban real estate markets. *Urban Geography*, 41(8), 1–28. <https://doi.org/10.1080/02723638.2018.1524653>
- Ullah, F., Sepasgozar Samad, M., & Siddiqui, S. (2017, December). An investigation of real estate technology utilization in a technologically advanced marketplace. In *Proceedings of the 9th International Civil Engineering Congress (ICEC-2017), "Striving Towards Resilient Built Environment," Karachi, Pakistan* (pp. 22-23).
- Wang, P., Wu, P., Wang, J., Chi, H.-L., & Wang, X. (2018). A Critical Review of the Use of Virtual Reality in Construction Engineering Education and Training. *International Journal of Environmental Research and Public Health*, 15(6), 1204. <https://doi.org/10.3390/ijerph15061204>
- Xiong, J., Hsiang, E.-L., He, Z., Zhan, T., & Wu, S.-T. (2021). Augmented reality and virtual reality displays: emerging technologies and future perspectives. *Light: Science & Applications*, 10(1). <https://doi.org/10.1038/s41377-021-00658-8>
- Yin, K., He, Z., Xiong, J., Zou, J., Li, K., & Wu, S.-T. (2021). Virtual reality and augmented reality displays: Advances and future perspectives. *Journal of Physics: Photonics*. <https://doi.org/10.1088/2515-7647/abf02e>
- Yun-Han, L., Tao, Z., & Shin-Tson, W. (2019). Prospects and challenges in augmented reality displays. *Virtual Reality & Intelligent Hardware*, 1(1), 77. <https://doi.org/10.3724/sp.j.2096-5796.2018.0009>
- Zhan, T., Yin, K., Xiong, J., He, Z., & Wu, S.-T. (2020). Augmented Reality and Virtual Reality Displays: Perspectives and Challenges. *IScience*, 23(8), 101397. <https://doi.org/10.1016/j.isci.2020.101397>