

**T.C.
BAHCESEHIR UNIVERSITY
GRADUATE SCHOOL
THE DEPARTMENT OF BUSINESS ADMINISTRATION**

**THE IMPACT OF VIRTUAL REALITY USAGE ON CUSTOMER SATISFACTION IN
THE REAL ESTATE MARKETING**

MASTER'S THESIS

YASEMIN ELZEIN

ISTANBUL 2024

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THESIS ADVISOR
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03/09/2024

MASTER THESIS APPROVAL FORM

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Name of The Thesis:	The Impact of Virtual Reality Usage on Customer Satisfaction in Real Estate Marketing
Thesis Defense Date	03.09.2024

This thesis has been approved by the Graduate School which has fulfilled the necessary conditions as Master thesis.

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ABSTRACT

THE IMPACT OF VIRTUAL REALITY USAGE ON CUSTOMER SATISFACTION IN THE REAL ESTATE MARKETING

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MBA Master's Program

Thesis Advisor: Ahu Ergen

August 2024, 34 pages

This impact of virtual reality usage on customer satisfaction in real estate marketing. Important definitions, like virtual reality, customer satisfaction, real estate, immersion, and presence, are defined. The theoretical framework gives useful information about using VR in real estate marketing and its effects on customer satisfaction. This research provides real estate agencies with guidance to enhance their marketing strategies by using VR and enhance their customers' satisfaction.

Keywords: Virtual Reality (VR), Customer Satisfaction, Real Estate, Immersion, Presence.

ÖZ

GAYRİMENKUL PAZARLAMASINDA SANAL GERÇEKLİK KULLANIMININ MÜŞTERİ MEMNUNİYETİ ÜZERİNDEKİ ETKİSİ

Yasemin Elzein

MBA Master's Program

Tez Danışmanı: Ahu Ergen

Ağustos 2024, 34 Sayfa

Bu tez, emlak pazarlamasında sanal gerçeklik kullanımının müşteri memnuniyeti üzerindeki etkisini inceler. Sanal gerçeklik, müşteri memnuniyeti, emlak, dalma ve varlık gibi önemli tanımlar tanımlanmıştır. Teorik çerçeve, emlak pazarlamasında VR kullanımı ve müşteri memnuniyeti üzerindeki etkileri hakkında yararlı bilgiler verir. Bu araştırma, emlak acentelerine VR kullanarak pazarlama stratejilerini geliştirmeleri ve müşterilerinin memnuniyetini artırmaları için rehberlik sağlar.

Anahtar Kelimeler: Sanal Gerçeklik (VR), Müşteri Memnuniyeti, Gayrimenkul, Daldırma, Varlık.



To My Family

ACKNOWLEDGMENTS

This thesis represents not just the culmination of research and hard work but also the love, support, and encouragement of so many people who have been part of this journey.

First, I want to express my deepest gratitude to my advisor, Prof. Dr. Ahu Ergen. Your guidance has been a light during the darkest and most challenging times of this journey, and I cannot thank you enough for your patience and wisdom.

To my family, who have been my cheerleaders and confidants. To my mother, Edibeh, thank you for always believing in me, even when I doubted myself. Your unconditional love has been my greatest source of motivation. I wouldn't be here without you, everything you did for me, and every word you said. To my brothers, Aghead, Raghead, Ahmad, Mohammad, and Baker, thank you for always knowing how to make me laugh and for reminding me to stay grounded. Your belief that I will be here one day made that true.

To my uncles, Ahmad, Maher, Tarek, and aunt Reem, words cannot express my gratitude. You have been my anchor, my haven, and my lifeline. Your unwavering belief in my potential and your constant encouragement have been the bedrock of my academic growth.

To my soulmate Nouran, thank you for being there through every triumph and every tear, and for understanding me even when I couldn't find the words to explain. This thesis is as much yours as it is mine. Thank you, from the bottom of my heart.

To my endless love, my partner, my everything, my husband Waseem, you did a lot for me, you took my anger, fear, and confusion from me to complete this work. thank you for being by my side every second. Your love helped me accomplish this work perfectly.

Finally, I want to dedicate a special thanks to my father Ghassan, who is no longer with us. Dad, you were my first hero, the person who taught me the value of hard work, resilience, and kindness. Though you are not here to see this moment, I feel your presence with me every step of the way. I miss you every day, and I hope this work makes you proud.

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LIST OF ABBREVIATIONS

VR	Virtual Reality
SPSS	Statistical Package for the Social Sciences



Chapter 1

Introduction

In recent decades, there has been a steady rise in digitization, resulting in our current state of living in a digitalized environment. Technology has significantly facilitated various aspects of our lives. The utilization of various technologies enables us to do tasks with greater speed and efficiency (Crittenden et al., 2020). Virtual reality (VR) stood out as one of the most crucial technologies among them. VR refers to the computing discipline that aims to construct a simulated world in which users can fully immerse themselves and interact using specialized devices. These devices simulate an environment and provide sensory feedback to create a highly realistic experience (Yuri Antonio Gonçalves and Boas, 2013).

The marketing field has witnessed that VR technologies are effective for use in marketing (Alcañiz et al., 2019). The utilization of VR technology has the potential to facilitate a meaningful connection between companies and consumers within the digital landscape, as it enables a shared experience that cultivates a sense of connection (Alcañiz et al., 2019).

Clark (2017) claims that the primary significance of VR is its ability to facilitate connections, despite its appealing nature. According to Barnes (2016), the integration of VR into customer satisfaction can enable marketers to provide a range of experiences to their customers, encompassing sensory, psychological, imaginative, intellectual, tangible, and social status-related experiences.

Accordingly, VR technology has the potential to enhance the growth of real estate companies, attract a wider range of customers, and provide exceptional services. Therefore, it is crucial to embrace this new technology in the current period (Gleb, 2020).

1.1 Theoretical Framework

This study aims to examine the impact of VR on customer satisfaction in the marketing field, particularly in the real estate sector. The theoretical framework directing this research attempts to clarify the relationship between the variables represented by the usage of VR as an independent variable and customer satisfaction as a dependent variable. The immersion and presence act as mediating variables in the connection between the usage of VR and customer satisfaction. This study explores the impact of VR usage in real estate marketing strategies on customer satisfaction by presenting a model that examines the mediating effects of immersion and presence on satisfaction.

1.2 Statement of the Problem

This study will explore how virtual reality affects customer satisfaction in real estate marketing. There have been few studies executed on the utilization of VR in marketing strategies within real estate companies and its impacts on customer satisfaction. Pleyres and Poncin (2020) state that, as an underscore of the substantial influence of the method of presentation, the VR condition provided an enhanced positive experience in comparison to the photo condition, resulting in increased feelings of presence and entertainment. The VR presentation effectively enhanced buyers' perception of the options and motivated them to visit the properties. The main drawback of the study is that it did not investigate the impact of VR technology on users' learning of knowledge regarding properties. Research shows that having an informative aspect should be taken into account (Pleyers and Poncin, 2020). Moreover, numerous studies have been conducted on this topic.

Table 1

Presents Some Of These Investigations Conducted About VR And Real Estate

Previous Studies Conducted about VR and Real Estate					
Author Name	Year of Publish	Study title	Research Design Type	Findings	
Dariah Vandercammen	2020	A study on the possible success of virtual reality in the real estate business in Belgium	Quantitative	Virtual reality has demonstrated its ability to enhance the real estate industry in Belgium.	

Table 1 (cont. d)

Gonçalo Ambrósio Pinhão	Melo Silva	2020	How the Quantitative Implementation of Virtual Reality Technologies will Influence the Real Estate Market		The integration of virtual reality (VR) in the real estate industry requires potential home purchasers to adjust, as the traditional home buying process has remained unchanged for many years. There are numerous potential pitfalls as well as numerous potential successes. The potential concerns of prospective home buyers surrounding VR technology will likely compel corporations to prioritize the software's quality.
Kholim Anis Syazwani Sukereman Siti Hasniza Rosman Fatin Nur Hanis Jaafar	Sahray	2023	The implementation of virtual reality (VR) technology in the real estate industry	Systematic literature review from previous studies	The stakeholders in the real estate business should fully leverage virtual reality (VR) technology as a novel marketing method for real estate. Given its demonstrated ability to facilitate property tours, enrich the experience of potential buyers, and serve as a sophisticated marketing tool, virtual reality (VR) technology can assist realtors in adapting to the changing

real estate sector and ensuring their survival.

Table 1 (cont. d)

Athira Rahinah Ibrahim Maszura Abdul Ghafar	Azmi	2021	Smarter real estate marketing using virtual reality to influence potential homebuyers' emotions and purchase intention	Qualitative	Potential homebuyers can experience the same pleasure and arousal when viewing a house virtually as they would in a physical show unit.
Athira Rahinah Ibrahim Maszura Abdul Ghafar Ali Rashidi	Azmi	2023	Metaverse for Real Estate Marketing: The Impact of Virtual Reality on Satisfaction, Perceived Enjoyment, and Purchase Intention	Qualitative	This research suggests that metaverse with virtual reality can improve consumer experience in real estate by strengthening human-computer interactions.
Shumank Deep Sushant Vishnoi Radhika Malhotra Smriti Mathur Hrishikesh Yawale Amit Kumar Anju Singla		2023	Influence of augmented reality and virtual reality on real estate investment decisions: understand consumer perspective in Indian AEC industry	Quantitative	Utilizing virtual reality technologies can improve customer happiness, boost property sales, and secure a competitive edge in a rapidly changing real estate market.
Filip Gunnarsson François Mirza Ali Khan		2020	The effects of VR on consumer attitudes - lessons from implementing VR	Qualitative	VR can create an emotional and memorable experience

Table 1 (cont. d)

Faris Hussin Sharikin Bakar	Anwar Ariza Abu	2023	The Adoption of Database Virtual Reality from 5 Technology in Real previous Estate Marketing: A studies Review	The utilization of virtual reality (VR) technology in real estate marketing has the potential to offer significant competitive benefits. It enables prospective buyers to conveniently explore properties and simplifies the purchasing process.
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1.3 Purpose of the Study

The purpose of this research is to investigate the effects of virtual reality on customer satisfaction within the marketing domain, with a particular focus on the real estate sector. The study seeks to comprehend the influence of VR usage on customer satisfaction and the roles of immersion and presence in that relation, to augment the current body of knowledge in this field.

The first part of this research concentrates on the problem and purpose of the study. It also explains the development of the hypotheses. The second part of this research builds upon existing literature by looking at multiple parts, the application of VR technology in marketing, the significance of customer satisfaction, the real estate industry, and the integration of all of these aspects. The third part outlines the methodology used for data gathering, the specific type of analysis conducted, and the constraints observed throughout this research. The fourth part presents the study's conclusions derived from quantitative research.

1.4 Research Questions and Hypotheses

Research Questions:

The study seeks to clarify the impact of utilizing VR on customer satisfaction within the context of real estate marketing methods. Thus, it is vital to comprehend how customers may be

satisfied using VR applications in the real estate sector. To address this matter, the study will define the following questions:

- 1) Does the use of VR in real estate marketing affect customer satisfaction?
- 2) Does VR in real estate marketing affect immersion and presence?
- 3) Do immersion and presence affect customer satisfaction in real estate marketing?

Hypotheses of the study:

VR has been used in several industries, but its adoption in the real estate sector is relatively new and has gained momentum in recent years (Pinhão, 2022). This study aims to determine if the utilization of VR in the real estate industry will affect the satisfaction of potential home buyers by integrating the mediating role of immersion and presence. Thus, the study tested multiple hypotheses that specifically addressed the correlation between the variables. The hypotheses are described as follows:

- H1: The use of VR affects customer satisfaction in the real estate market.
- H2: The use of VR affects Immersion in the real estate market.
- H3: The use of VR affects presence in the real estate market.
- H4: Immersion affects customer satisfaction in the real estate market.
- H5: Presence affects customer satisfaction in the real estate market.
- H6: Customer satisfaction varies according to gender.
- H7: Customer satisfaction varies according to material status.
- H8: Customer satisfaction varies according to age.

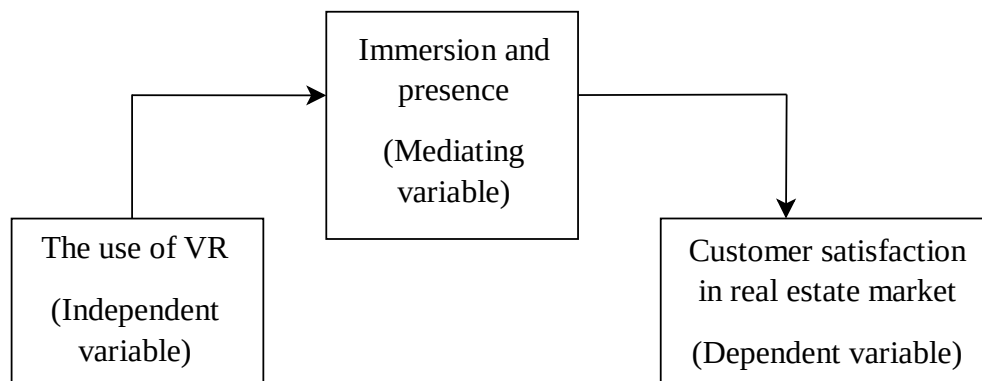


Figure 1. Theoretical framework model

1.5 Significance of the Study

According to Statista (2024), in 2023, the global revenue of real estate firms reached a valuation of 4.34 trillion U.S. dollars. That is a decrease compared to 2019 when the market reached its highest point at 5.04 trillion U.S. dollars. The commercial real estate market encompasses a range of services such as management and consultancy services, commercial and residential leasing, capital market activities, and various other services.

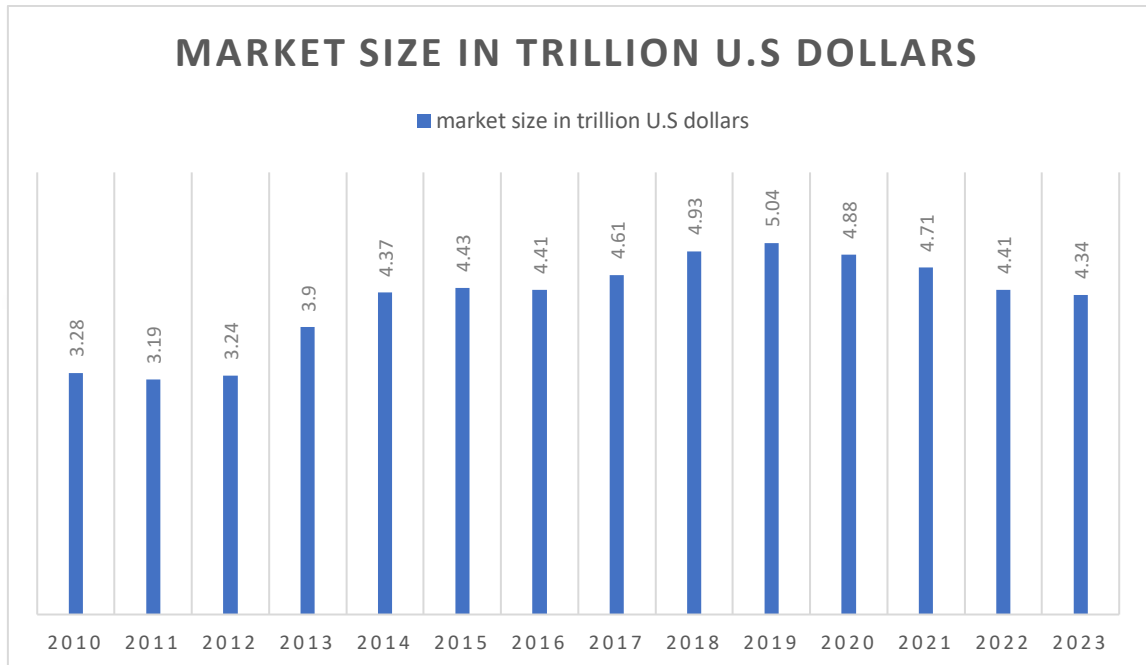


Figure 2. Bar graph showing real estate market size
(Statista, 2024).

The real estate industry has a substantial impact on the economics of countries around the globe. In the United States, the sector accounted for 11.13% of the gross output, whilst in China, it constituted 5.98% of the GDP (Zhang et al., 2017). Although, in Australia, it constituted 11.4% of the gross domestic product (GDP) of its major cities (Chandler, 2016). According to Shahid et al. (2017), from 2011 to 2014, the real estate sector in Malaysia made a 4.2% contribution to the country's GDP. These statistics illustrate that the real estate industry makes a substantial contribution to the economic prosperity of nations globally and plays a vital role in the GDP of numerous countries (Naeem et al., 2023).

The importance of this study is in its capacity to enlighten real estate agencies about the profound impact of VR on customer satisfaction in the real estate marketing industry. It provides practical observations that might influence future tactics, enhance customer satisfaction, and

encourage innovation within the sector. If the study demonstrates favorable impacts on customer satisfaction, marketers can next concentrate on promoting the VR elements in their advertising. However, if obstacles are detected, marketers have the opportunity to tackle such issues to improve the entire consumer experience.

1.6 Definitions

Virtual reality (VR): a computer-based information processing system that allows users to generate and experience a virtual environment. It creates a multi-dimensional information space where users can immerse themselves, transcend reality, and interact using 3-D glasses, sensing gloves, and other additional sensing devices (Kholim Sahray et al., 2023).

Real estate: the land and any permanent structures, such as a house, or improvements that are connected to the land, regardless of whether they are natural or man-made (Chen, 2023).

Presence: the subjective perception of being in a specific location or area, even when physically located elsewhere (Witmer and Singer, 1998).

Immersion: the act of fully integrating oneself, either physically or virtually, into the experience (Pine II and Gilmore, 2002).

Chapter 2

Literature Review

2.1 Introduction to virtual reality

2.1.1 Definition and history of virtual reality. Virtual reality is a digitally created environment that aims to model something like a real-life interaction (Lee et al., 2012). This technology utilizes gesture recognition to enhance the virtual experience by accurately detecting and interpreting the users' gestures (Vignais et al., 2010). VR is an established technology. The inception of computerized VR can be traced back to the late 1960s, but the term itself was not created until the 1980s. It was around this time that head-mounted displays and haptic gloves were commercially introduced, enabling users to experience simulated 3D environments with surround stereoscopic vision (Barnes, 2016). VR was first introduced in computer games during the early 1990s. Meanwhile, Ford adopted VR technology to design and produce its vehicles in 1999 (Gaudiosi, 2015). VR, as defined by the Oxford English Dictionary, is the computer-generated simulation of a three-dimensional image or environment that can be interacted with in a seemingly real or physical manner by an individual utilizing specialized electronic equipment, such as a helmet with an internal screen or gloves equipped with sensors. NASA (2016) provides a more detailed description of VR as "the utilization of computer technology to generate a feeling of an interactive three-dimensional environment in which objects possess a sense of spatial presence". Virtual Reality fully envelops a person into a simulated world or encounter, usually accomplished by employing a head-mounted display (HMD) that is frequently linked to headphones, controllers, and other devices enabling users to navigate through the virtual experience. An essential attribute of an exceptional VR experience is the sensation of 'presence', wherein users genuinely perceive themselves to be immersed in the artificial environment being depicted (Intelligence, 2016).

Current VR technology commonly utilizes head-mounted displays (HMDs), also known as VR headsets, which allow users to immerse themselves in a virtual environment by obscuring the actual world (Brooks, 1999).

Ivan Sutherland invented the first Head-Mounted Display (HMD), known as The Sword of Damocles, in the 1960s. In the 1970s, Eric Howlett introduced the Large Expanse Extra Perspective (LEEP) system (Sherman and Craig, 2018). VPL Research created multiple supplementary VR devices throughout the 1980s, including the EyePhone (a head-mounted display), the AudioSphere (a sound system), and the DataGlove and DataSuit (used for tracking

movements) (Raitt, 1991). Initially, VR technology had practical applications such as flight simulation and military training, rather than being mostly used for gaming. But around the 1990s, the first consumer-oriented head-mounted displays (HMDs) like Sega VR and Nintendo's Virtual Boy were created (Rebenitsch, 2015). Nevertheless, these VR systems, as with others, exhibited limited graphical capabilities and frequently induced motion sickness, resulting in their lack of notable success. The development of the CAVE Automatic Virtual Environment was aimed at enhancing resolution and reducing system latency, resulting in improved quality (Cruz-Neira et al., 1993). However, due to the need for a specifically designated space and costly projectors, CAVEs have not been adopted by individual households. Instead, they are primarily utilized for professional applications in fields such as engineering, military training, science, and medicine (Muhanna, 2015). Approximately two decades later, the gaming industry introduced Head-Mounted Displays (HMDs) such as Oculus Rift, HTC VIVE, and PlayStation VR, which facilitated the widespread adoption of VR technology in private residences. In addition to head-mounted displays (HMDs), contemporary VR technology commonly incorporates audio devices such as headphones or speakers, as well as controllers for tactile feedback. However, advanced VR systems may also incorporate haptic gloves, haptic suits, multi-dimensional treadmills, or other hardware to enhance the immersive experience (Mach et al., 2019). The introduction of wireless, autonomous VR systems such as Oculus Quest and HTC VIVE Focus has further reduced the barriers to home usage, as they no longer require a connection to a high-performance computer for rendering high-quality graphics. Modern VR technologies are sophisticated systems that substitute real-world sensory input with artificial inputs, including three-dimensional visual imaging, spatialized sound, and force or tactile feedback (Bowman and McMahan, 2007).

2.1.2 VR technology in different industries. Virtual reality has been identified as one of the leading strategic technologies that are projected to develop by 2028. The current valuation of the global market for VR applications is approximately US\$14 billion. Conservative projections suggest that this industry will expand to reach US\$50-60 billion during the next 3-5 years (Gallagher, 2019). Approximately 55% of buyers worldwide hold the belief that VR and augmented reality (AR) will attain the same level of popularity as smartphones. Additionally, 62% of shoppers express the opinion that VR is more enjoyable than internet shopping. Currently, the majority of the expansion in the VR market is driven by AR applications. These applications are prevalent in several sectors like tourism, entertainment, education, real estate, transportation, museums, automotive, and retail, particularly in the fashion, home furnishing, and beauty

industries. The exponential expansion of AR apps has been driven by the advancement of development toolkits such as ARKit for iOS devices and ARCore for Android smartphones (Worldpay, 2018). VR is additionally employed in various other domains (Wohlgenannt et al., 2020).

Table 2

The Use Of VR

The use of VR in different industries	
The firm	Purpose of VR usage
IKEA	for training and familiarizing new staff
Macy's	to enrich the shopping experience of its consumers
Verizon	For training tool to educate their retail clerks on how to effectively manage hostage and robbery scenarios
Deutsche Bahn	to address scenarios that are not feasible to teach on actual trains, such as fire handling
Volkswagen	for prototype purposes
Tata Motors	To offer its customers the ability to customize cars using VR
MHI Vestas	sales tool to demonstrate offshore wind turbines
Accenture	for people assessment
PwC	performs diversity and inclusion training using VR
BDO	testing the suitability of VR for personnel recruiting
Farmers Insurance	use VR training programs focused on enhancing interpersonal skills
Cigna	to perform health screenings and provide health-related information to its customers
PNB MetLife	engages in VR consultations with its consumers
Takeda	uses VR for recruitment
Columbia University	to provide training for surgeons
Harvard Medical School	

Table 2 (cont. d)

Ivoclar Vivadent	As a means of diverting patients' attention during dental procedures
The Dallas Cowboys	implemented VR training for its players
National Association for Stock Car Auto Racing (NASCAR)	to enable fans to remotely experience racing events

This list is not comprehensive, but it includes some of the businesses that have utilized VR in recent years or have intentions to implement VR soon. Additional sectors, including real estate, architecture, and tourism, have also adopted VR technology to enable their clients to visually explore and examine locations. Furthermore, VR technology is progressively employed in military instruction and law enforcement, such as simulating de-escalation techniques in crucial scenarios. It is also utilized in construction and manufacturing for safety training purposes. Additionally, VR is being explored as a new media channel in journalism and media distribution. Specifically, human resources tasks such as recruiting, evaluating, integrating new employees, and providing training in areas such as social skills, procedures, and safety can be enhanced through the use of VR technology. VR technology is also used in business applications to cater to clients, such as virtual marketing, shopping, and consultation. Additionally, VR has the potential to introduce new corporate processes and procedures, such as VR-based prototyping or remote work. Given the wide range of corporate uses, it is unsurprising that major VR hardware manufacturers have begun offering enterprise versions of their devices, such as Oculus for corporate and HTC VIVE Enterprise. In light of this context, the following section elucidates the challenges faced by IS research in examining the practical implementation and utilization of VR (Wohlgenannt et al., 2020).

The exponential expansion of VR applications in marketing has predominantly been propelled by technology advancements in digital displays, motion sensors, computer vision, and computation. These advancements have made VR significantly more immersive and captivating for users. The gaming business has had the most significant advancements thus far, but medicine, education, travel, entertainment, and marketing are other crucial sectors for application (Wedel et al., 2020).

2.1.3 Virtual reality in marketing. Computer visual simulations of retail shopping environments have gained popularity as a technique for doing marketing research. They enable manufacturers and retailers to experiment with creative marketing concepts in realistic and competitive scenarios, by including shoppers. Virtual store testing provides more comprehensive behavioral data compared to conventional techniques of consumer research and offers a quicker and more cost-effective alternative to in-store field studies (Burke, 2017).

Technological advancements have made significant strides across various industries in the past decade. Notably, the marketing field has witnessed substantial progress, to the extent that technology has become linked to marketing definition (Alcañiz et al., 2019). With the advent of advanced technologies like VR, which enables the immersion of customers in entirely virtual environments and offers an overlay of virtual content, consumers can now engage with these environments and experience a heightened level of satisfaction. This immersive experience can be described as vivid, involving multiple psychological and active states for consumers as they interact with three-dimensional products within the virtual environment. This virtual experience offers a unique opportunity that lies between direct and indirect experiences. Direct experiences involve product trials where consumers can physically interact with the products, while indirect experiences encompass various aspects of traditional advertising, such as visual or audio advertising. Hence, it can be observed that the use of VR in marketing endeavors has a discernible impact on diminishing the perceived danger experienced by customers, while concurrently fostering a heightened sense of trust, in contrast to conventional advertising methods that statically offer products, relying solely on textual content for description (Alcañiz et al., 2019). In other words, the utilization of contemporary technologies, such as video and virtual reality (VR), has a highly favorable influence on the comprehension of marketing messages and results in a significantly improved reception of these messages among potential customers. Consequently, these technologies can greatly bolster marketing strategies and sales, particularly for products and solutions that rely on these advanced technologies (Grudzewski et al., 2018).

2.1.4 Virtual reality in real estate. In recent years, the real estate industry has witnessed a significant integration of VR technology. This integration has manifested in various forms, including virtual open homes, virtual staging for pre-sale home decoration, construction planning, and building information modeling. VR has demonstrated its capacity to offer a heightened sense of realism and has proven instrumental in facilitating data visualization, particularly when compared to alternative technologies such as computer-aided design or animation (Xiong et al.,

2022). The aforementioned factors indicate that the incorporation of VR technology into real estate companies' marketing campaigns has the potential to influence the decision-making process of both current and prospective buyers. This is primarily due to the immersive three-dimensional experience it offers, which surpasses the limited engagement provided by two-dimensional photographs. Consequently, VR can significantly aid prospective buyers in making informed decisions regarding property purchases. In contemporary times, developers assert that technology possesses the capability to offer an effective method for envisioning, marketing, and selling real estate works in progress. VR and AR technologies address the perceptual limitations in the real estate industry by providing buyers with the ability to visually perceive the outcome of a planned project. These technologies allow investors to envision the appearance of a space once it has been constructed, renovated, or vacated (Alaseeri et al., 2021). The predominant application of VR technology within the real estate industry has been in the field of property showcases. This includes both sales listings and rental listings. According to Matterport, there is a significant increase of 95% in the likelihood of homebuyers contacting a real estate agent upon viewing a real estate listing that includes a 3-D tour. Consequently, properties that incorporate a 3-D tour have a reduction of around one-third in their time spent on the market (Abualzolof, 2022). Based on the findings of Azmi et al. (2021), it was observed that a notable disparity exists in the atmosphere and intention to acquire a property when comparing actual and virtual surroundings.

In contrast, there was no statistically significant difference observed in the elicitation of pleasure and arousal emotions between real and virtual environments. The findings indicate that the ambiance of the environment has a significant impact on the experience of pleasure and arousal. Furthermore, pleasure was found to have a significant influence on purchase intention, while arousal demonstrated an insignificant effect on purchase intention specifically within the virtual environment (Azmi et al., 2021).

Virtual reality has long been a technology that the real estate industry has eagerly awaited, holding immense potential that is yet to be fully explored. According to The Insight Partners' extensive research, the global VR market was valued at \$27.96 billion in 2021 and is expected to experience substantial growth, reaching an estimated value of \$252.16 billion by 2028. VR has proven to be extremely beneficial for the real estate industry. VR has proven to be a valuable tool in the property industry, offering enhanced visual capabilities that improve efficiency and effectiveness for stakeholders (Abualzolof, 2022).

2.2 Customer Satisfaction

2.2.1 The beginnings of customer satisfaction. According to Khalique Talukder (2018), we can determine that satisfaction is the emotional response experienced by an individual when comparing their perceived performance or outcome to their expectations, resulting in either pleasure or disappointment. There are two main ways to think about satisfaction: transaction-specific satisfaction and cumulative satisfaction. Transaction-specific satisfaction refers to the customer's assessment of their experience and response to a given service interaction. The customer's initial reaction to a product or service is known as the first-time experience. On the other hand, cumulative satisfaction refers to the customer's overall appraisal of their entire consumption experience up to now, which includes all the interactions they have had with the services offered to them daily (Khalique Talukder, 2018).

Flores (2008) suggests that customer satisfaction has long been a topic of significant interest, but the technique of measuring customer satisfaction is very new, dating back only around 20 years. The significant US business focus on quantifying customer satisfaction originated in the early 1990s when various factors coincided to create an uncertain business environment characterized by economic recession, intense competition from both domestic and foreign companies, and a decline in demand in many developed economies. US corporations began to recognize that numerous overseas competitors were more proficient in meeting the demands of American consumers, as rivalry intensified. Amidst the ongoing changes in various industries, numerous businesses have begun to prioritize the task of comprehending their customers more effectively. This involves investing more resources into understanding their needs, enhancing products and services based on customer feedback, and elevating service quality to optimize their ability to stay ahead of competitors.

2.2.2 Customer satisfaction importance. Business encompasses more than just fulfilling objectives; it should also prioritize customer satisfaction. Customer satisfaction is a fundamental objective that most organizations strive to accomplish. Client satisfaction is crucial since it serves as an indicator of the market's acceptance of the firm. The longevity of a business is attributed to its capacity to cultivate a loyal customer base. A study demonstrates that customers exhibit brand loyalty when they have received excellent products and services from a specific company (Yussoff and Nayan, 2020).

To clarify, customer satisfaction is a fundamental principle in contemporary marketing theory and application, emphasizing the importance of providing satisfaction to customers to achieve profitability. Customer satisfaction is essential for fulfilling the diverse requirements of both customers and businesses. The recognition of its significance has resulted in a widespread increase in research on customer satisfaction among marketing and psychology scholars in the last fifty years. Pursuing customer satisfaction has now become a crucial strategic goal for most companies, as it is necessary for their survival and competitiveness. Customer happiness has dual effects: defensively, it helps retain consumers by lowering customer defection, and offensively, it attracts new customers through positive word of mouth or recommendations from delighted customers. The majority of research recognizes that consumer expectations have a pivotal influence on the assessment of customer happiness (Yi and Natarajan, 2018). Moreover, the construct of customer satisfaction has demonstrated its significance as a precursor to several constructs related to consumption. As a result, it will probably continue to be a fundamental idea in business and economic disciplines (Bosnjak, 2014).

Customer expectations can be seen as a level of adaptability and are believed to establish a basis for making comparative assessments. Customer satisfaction is predominantly determined by the evaluation of expectations for actual performance. If the performance exceeds (or falls short of) expectations, it is probable that customer satisfaction (or dissatisfaction) will occur. Satisfaction arises from experiencing performance that exceeds expectations (positive disconfirmation), whereas dissatisfaction arises from encountering performance that falls short of expectations (negative disconfirmation) (Oliver, 1980). Also, current studies on the impact of customer satisfaction have concentrated on variables that are directly relevant to managers and have investigated non-linear effects. Customer satisfaction has a significant impact on customers' willingness to pay a higher price. The study revealed an inverted S-shaped association, indicating that the extremes of the satisfaction continuum had a stronger impact on customers' willingness to pay a higher price compared to the middle range of satisfaction dimensions (Homburg, et al. 2005).

2.2.3 Customer satisfaction in real estate. The real estate sector has evolved to prioritize service and customer satisfaction. Consequently, the industry should have a significant stake in measuring customer satisfaction (Phillips and Roper, 2009). In addition, the intense competition in the real estate market compels real estate developers to address the task of choosing the most

optimal project construction phasing option which is evaluating and assessing two crucial indicators of success: profit and customer satisfaction. The adopted construction phasing alternative directly impacts these requirements (Marzouk and Hamdala, 2024). Because of that, assessing customer satisfaction in service organizations, particularly in the real estate management sector, is becoming progressively crucial for customer service professionals in these companies. The public discourse surrounding real estate management companies is increasingly focused on their quality, honesty, and client happiness, all of which have a direct impact on the overall reputation of the organization. The key determining factor is mostly based on the particularities of the service offered in the realm of real estate management. The satisfaction level in this area mostly depends on the service's quality, price, communication method, and adherence to deadlines. The level of satisfaction with the services utilized in this procedure could potentially have a significant impact (Puķīte and Geipele, 2017).

Customer satisfaction in the realm of real estate management, unlike manufacturing and specific service sectors, the real estate industry does not solely involve the sale of products and services. It encompasses a broader range of services requiring long-term contracts and establishing a reputable image in interactions with customers and potential buyers (Palm, 2016). According to Li (2003) and Matzler and Hinterhuber (1998), the expense associated with acquiring new consumers is significantly greater compared to retaining existing clients. The real estate sector prioritizes customer retention above obtaining new customers, as it is more beneficial to focus on the demands of existing clients. When customers have a substandard customer experience, characterized by a lack of satisfaction, they will inevitably seek alternative services elsewhere, 32% of customers would cease engaging with a brand they have a strong affinity for following a single negative encounter. Following numerous negative encounters, irrespective of brand loyalty, 45% of buyers will disengage and go to a different brand (Puthiyamadam and Reyes, 2018). Because of that, ensuring customer satisfaction is crucial for achieving profitability and maintaining long-term success (Preko, et al., 2014). In addition, decreases the expenses of future transactions and improves the reputation of the organization (Anderson, et al., 1994).

2.2.4 Customer satisfaction and VR. Virtual reality has become a prominent technological advancement that gives users immersive and interactive computer-generated settings. This technology has introduced novel approaches for providing impactful experiences in several domains, including marketing situations (Violante and Vezzetti, 2015). In recent years,

there has been a growing interest in examining the impact of VR on consumer decision-making. Retailers have begun incorporating VR technology into their marketing strategies to enhance efficiency and customer satisfaction (Xiong et al., 2022). By utilizing VR, companies aim to provide consumers with more informative and engaging interactions, enabling them to gather additional information and develop a deeper understanding of the products. This immersive experience is intended to enhance consumer perception and foster a more profound connection with the products offered. The utilization of VR enables consumers to engage in virtual experiences of items or services, therefore augmenting their comprehension of those offerings (Li et al.2003). As noted by Santos (2022), the utilization of these technologies has significant promise in enhancing customer satisfaction. The enhanced precision observed in the comparison between online and physical products contributes to the expeditiousness and assurance of the purchase procedure, hence reducing the level of exertion required. Organizations can finally establish distinctiveness and enhance their market positions in the challenging digital landscape.

According to CB Insights (2022), we can determine that in recent times, VR has gained recognition for its application in the marketing and retail sectors, providing enhanced customer satisfaction. Marriott Hotels and Amazon have been notable examples in recent years, Marriott Hotels collaborated with Samsung to provide VRoom Service, a feature that allows Marriott customers to order a VR headset to their room using the hotel's mobile app. With this headgear, visitors may virtually tour various destinations. The pre-recorded VR videos showcasing travel destinations are stored within the VR headset, allowing guests to effortlessly engage in immersive virtual tours. When compared to static pictures, the VR experience provides guests with more realistic and immersive experiences (Stephens, 2017). Furthermore, Amazon launched its VR kiosks in 10 shopping malls as a means of promoting the Prime Day shopping event. Customers donned VR headsets and navigated through digitally simulated rooms that replicated different parts of the Amazon store, including apparel, bath & cosmetics, and toys. These consumers utilized VR controllers to manipulate any object in a complete three-dimensional perspective (Horwitz, 2018).

2.3 Immersion

According to Pine II and Gilmore (2002), we can determine that immersion is the act of fully integrating oneself, either physically or virtually, into the experience. Also, the state of mind in which an individual perceives themselves to be fully encompassed by an environment that

continually provides them with an ongoing flow of inputs and sensations is referred to as immersion (Witmer and Singer, 1998). Furthermore, Immersion encompasses not only engagement with other participants but also the dynamic interaction between the virtual world and the individual. Immersion plays a crucial role in virtual, non-physical experiences as it governs the level of engagement, which in turn defines the duration of the interaction (Raptis, et al., 2018). Because of this, immersion takes place when the one who is participating in the experience has a significant amount of interest in the activity that is taking place. When this is taken into consideration, the power of a virtual world to generate engagement is directly associated with its ability to elicit active participation and, consequently, immersion of participants (Loureiro, et al., 2020).

Immersion is a significant factor that contributes to the overall quality, satisfaction, and reliability, which in turn affects a consumer's future purchase intentions. Furthermore, immersion is emphasized as a crucial component in inter-organizational marketing and service marketing (Kim and Chang, 2020). For this instance, Virtual Touring Solutions provides a realistic experience of walking through the property. Potential buyers have the opportunity to embark on an immersive and authentic experience, enabling them to fully understand the layout, flow, and distinctive characteristics of the home. Surprisingly, 44% of potential buyers are already influenced by 3D tours to interact more deeply, and VR tours enhance this effect by making it easier to explore properties remotely (Siddique, 2023). In doing so, the objective of an immersive simulation is to deceive one's senses, thereby strengthening the illusion of being in a different place than one's actual physical location (Sylaiou et al., 2010).

2.4 Presence

Presence is the subjective perception of being in a specific location or area, even when physically located elsewhere (Witmer and Singer, 1998). According to (Bulu,2012), we can determine that Presence and satisfaction are important topics in 3D virtual world literature, as he confirmed in his study about examines the correlation between three forms of presence - location presence, social presence, and co-presence - in virtual environments and their impact on student happiness and immersive tendencies, that 3D virtual worlds have significant advantages over 2D virtual learning environments, which might affect presence and enjoyment, also he determines that 3D virtual worlds differ from 2D virtual learning environments in depiction and student engagement. Furthermore, presence is a crucial characteristic of VR technology as it directly

influences the success of an activity in various application scenarios, in the framework of VR, refers to a mental state in which an individual is fully engaged and absorbed in the virtual environment, with minimal or no awareness of the external real world (Tussyadiah et al., 2018).

The presence of something was discovered to have a significant impact on satisfaction across different situations. Education has primarily focused on examining the mediating impacts of the two variables. For example, it is established that the presence of individuals has a significant influence on virtual learning (Bulu, 2012). Where it was interestingly, social presence communication has an effect on interaction satisfaction within chatbots, but the researchers were unable to identify a direct significant effect. However, when the effect was mediated through parasocial interaction, the effect became significant. This was explained by the necessity of establishing a connection with customers to cultivate a sense of closeness that would result in satisfying customers (Tsai, et al., 2021).

Chapter 3

Methodology

This chapter provides a detailed explanation of the methodology used in this study, which utilized a quantitative approach to thoroughly investigate the impact of virtual reality implementation in the real estate industry.

3.1 Research Design

The objective of this study is to provide a comprehensive understanding of the various uses of VR technology in all areas of marketing, with a particular emphasis the VR use in the real estate sector. The research aims to explore how this technology will influence customer satisfaction through immersion, and presence.

The study explores hypotheses on the relationship between factors. The hypotheses are explained below:

H1: The use of VR affects customer satisfaction in the real estate market.

H2: The use of VR affects Immersion in the real estate market.

H3: The use of VR affects presence in the real estate market.

H4: Immersion affects customer satisfaction in the real estate market.

H5: Presence affects customer satisfaction in the real estate market.

H6: Customer satisfaction varies according to gender.

H7: Customer satisfaction varies according to material status.

H8: Customer satisfaction varies according to age.

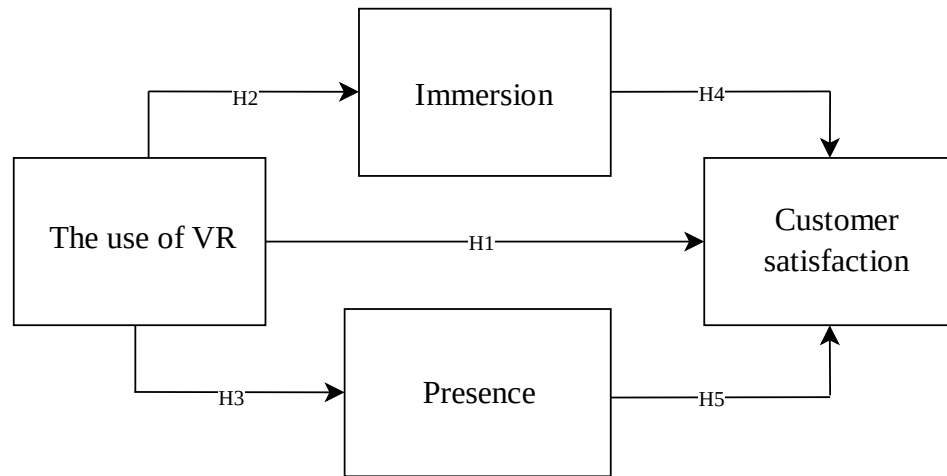


Figure 3. Research model

3.2 Universe and Participants

The study selected a sample of potential real estate buyers who are interested in properties in Türkiye. These individuals come from various demographics, including different age groups, income levels, and technological abilities, and are currently exploring real estate opportunities in Türkiye, because in recent years, Türkiye has seen a significant increase in the demand for residential and commercial properties, as noted by Estate (2023). This can be attributed to the country's growing population and thriving economy, which is widely acknowledged as one of the most dynamic and profitable worldwide. Türkiye's strategic geographical position, connecting Europe, Asia, and the Middle East, plays a crucial role in fueling the growth of its real estate industry. The real estate industry in Türkiye has seen significant growth in the past decade, solidifying its position as a major and thriving market on a global scale. The market has experienced steady growth due to various factors, including a growing population, increasing urbanization, and a strong economy. In 2020, the real estate industry in Türkiye made a significant contribution of approximately 8% to the country's gross domestic product (GDP), as per official data. The demand for properties is holding steady. According to data from the Turkish Statistical Institute, there was a small uptick of 1% in the overall number of home sales in the first eleven months of 2022, totaling 1.28 million units. In comparison to the previous year, there was a 0.5% decrease during the same time frame in 2021.

Dağlıoğlu's research in 2022 highlights the significant role of the real estate sector in Türkiye's economy, which has been steadily gaining importance. It attracts many Arab and foreign investors, tempting them to purchase properties and participate in the Turkish real estate market.

The residential sales numbers to foreigners experienced a notable 44% surge from 2020 to 2021. There are multiple factors at play here, including the wide array of options to choose from. Investing in real estate in Türkiye offers a unique chance to benefit from Turkish laws that allow investors to obtain Turkish citizenship. The main focus is on individuals who have used VR applications during their property search. This engagement is crucial in assessing the impact of VR on customer experience in real estate marketing. The sample was obtained by convenience sampling, a non-probability sampling method where researchers select their sample-based entirely on convenience, as described by Simkus (2023). Essentially, this suggests that the sample selection process was not random, but rather relied on lists compiled by real estate agents in Istanbul, which included their clients. The questionnaire was then circulated through online platforms. The present study employs a quantitative methodology to gather data from a targeted 150 person, to examine the effects of VR on customer satisfaction within the real estate industry. To safeguard participants' privacy and uphold the ethical standards of the research, participants will be provided with comprehensive information regarding the study's objectives and methodologies. Personal identifiers will not be gathered, thereby ensuring the anonymity of participants. Data will be handled with utmost confidentiality, accessible, and securely stored. Participants will retain the prerogative to withdraw from the study at any point without facing any adverse repercussions. The questionnaire was created using Google Forms Software to test the three specific hypotheses. Each section consists of questions that are directly related to the hypotheses. The questionnaire utilizes a combination of Likert scale questions to assess the attitudes of their experiences in the first part of the questionnaire, their feeling of immersion in the second part, their degree of presence in the third part, and their satisfaction in the fourth part. The last part covered data on demographics.

3.3 Data Collection

3.3.1 Data collection instruments. The study's hypotheses were tested utilizing an online survey provided via Google Forms. Utilizing Google Forms makes it simpler to generate questionnaires using a variety of scales and types (Mondal and Mondal, 2018).

A questionnaire prepared to test the study's hypotheses was implemented from prior studies which used a Likert scale for measurement. For the independent variable which is the use of VR, the questions were employed from the research of Cicek, Bernik, and Tomicic (2021). Customer satisfaction which is the dependent variable, the questions was employed from the

research of Ravindran, Burman and Rajkumar (2023). And, for the mediating variables, their questions were employed from the study of Hacikara, Zhang and Weinland (2022). The first mediating variable is immersion and the second one is presence. The demographics questions were adapted from the study of Pinhão (2022).

3.3.2 Data collection procedures. The procedures used to collect the study's data were intended to verify the reliability of the results. The first phase was for the pilot test, the questionnaire was evaluated using a pilot group of 50 respondents, and it continued for 10 days. The pilot assessment aimed to evaluate the variable scales's validity and reliability. Additionally, to ensure that there are no issues with questions and their clarity, technological errors, and the timing in answering the questions so that participants are not distracted and do not continue to answer. The second phase was the data collection for the whole targeted sample, and it went on for 20 days. So, the whole data collection phase was done within a month. Participants received their questionnaires through real estate agencies' customer services.

3.3.3 Data analysis procedures. The study's data was analyzed using the Statistical Package for the Social Sciences (SPSS). First, the pilot group's responses were exported from Google Forms as an Excel spreadsheet and coded to insert the data into SPSS. Reliability and validity tests were made on each variable to check the scale's reliability using Cronbach's alpha. The results were as follows:

Cronbach's alpha is .703 for the independent variable the use of VR.

Cronbach's alpha is .928 for the dependent variable customer satisfaction.

Cronbach's alpha is .892 for the mediating variable immersion.

Cronbach's alpha is .944 for the mediating variable presence.

The second step in this process was the data analysis for the targeted 150 participants their answers were taken from Google Forms transformed into an Excel file and coded to import the answers into SPSS. Regression, T-Test, and ANOVA analyses were employed on the study's hypotheses to be examined, as follows:

- A linear regression analysis was performed to evaluate hypothesis one, which examined the effect of VR use on customer satisfaction.
- A linear regression analysis was performed to evaluate hypothesis two, which examined the effect of VR use on immersion.

- A linear regression analysis was performed to evaluate hypothesis three, which examined the effect of VR use on immersion.
- A linear regression analysis was performed to evaluate hypothesis four, which examined the effect of immersion on customer satisfaction.
- A linear regression analysis was performed to evaluate hypothesis five, which examined the effect of presence on customer satisfaction.
- ANOVA analysis was performed to evaluate variation by age in customer satisfaction.
- ANOVA analysis was performed to evaluate variation by gender in customer satisfaction.
- A T-test was performed to evaluate variation by material status in customer satisfaction.

3.3.4 Reliability and validity

Table 3

The Reliability Of The Measuring Scales Used In The Study

Scale	Developer	N of items	Cronbach's alpha
The use of virtual reality (VR)	(Cicek et al, 2021)	6	.703
Customer satisfaction	(Ravindran et al, 2023)	3	.928
Immersion	(Hacikara et al, 2022)	4	.892
Presence	(Hacikara et al, 2022)	6	.944

3.4 Limitations

Similar to other studies, this research has certain limitations. As Virtual Reality (VR) is an emerging technology, the primary limitation of this research relates to the limited application of VR experience on a large scale. Additionally, the sample of the study consists of randomly selected potential property buyers from several real estate companies, rather than potential buyers belonging to a specific company that offers the possibility of introducing VR. It is worth noting that the sample consisted of people who wanted to purchase a property in Istanbul, which suggests that the findings may have differed under different circumstances.

Furthermore, the study exclusively utilized a quantitative data methodology, disregarding the potential advantages of integrating both quantitative and qualitative approaches in data collection. To improve the generalizability of its findings, the study should have expanded its methodology by including focus groups and increasing the sample size beyond the limited 150 individuals.



Chapter 4

Findings

The results of the research indicated that 46.1% of the people in the sample were female, 51.3% were male, and 2.6% chose not to say their gender. The age range extends from 5.3% under 20, 31.6% between 20 and 30, 35.5% between 30 and 40, and 27.6% above 40. The marital status of the respondents was 48.4% married, and 51.3% single.

The questionnaire consisted of five sections. The first section contained six questions about the use of virtual reality (VR). The second section contained three questions on customer satisfaction. The third section included four questions on immersion. The fourth section included six questions regarding presence. The final section aimed to gather information about participants' demographics and consisted of five questions.

The research hypotheses were examined using a multiple regression analysis, as well as a T-test to assess the effect of changes in marital status on customer satisfaction, and an ANOVA analysis to evaluate the effect of gender and age variations on customer satisfaction.

Table 4

Regression Analysis Of The Effect Of The Use Of Virtual Reality (VR) On Customer Satisfaction

Variable	B	Std. Error	Beta	t.	Sig.
constant	2.619	.633		4.135	<.001
The use of virtual reality (VR)	.343	.032	.660	10.763	<.001

Customer satisfaction $R^2=.436$, $F=115.842$, $P < 0.05$

The findings indicate that the p-value is 0.003, which is less than the significance level of 0.05. Thus, it appears that the use of virtual reality (VR) has an important effect on customer satisfaction. H1 accepted.

Table 5

Regression Analysis For The Effect Of The Use Of Virtual Reality (VR) On Immersion

Variable	B	Std. Error	Beta	t.	Sig.
constant	4.003	.828		4.835	<.001
The use of virtual reality (VR)	.434	.042	.649	4.835	<.001

Immersion $R^2=.421$, $F=108.901$, $P < 0.05$

The findings indicate that the p-value is <.001, which is less than the significance level of 0.05. Therefore, it shows that the use of virtual reality (VR) has a significant effect on immersion. H2 accepted.

Table 6

Regression Analysis For The Effect Of The Use Of Virtual Reality (VR) On Presence

Variable	B	Std. Error	Beta	t.	Sig.
Constant	4.645	1.279		3.631	<.001
The use of virtual reality (VR)	.791	.064	.709	12.301	<.001

Presence $R^2=.502$, $F=151.309$, $P < 0.05$

The findings indicate that the p-value is 0.02, which is below the significance standard of 0.05. As a result, it demonstrates that the use of virtual reality (VR) has a significant effect on presence. H3 is acceptable.

Table 7

Analysis Of The Effect Of Immersion On Customer Satisfaction

Variable	B	Std. Error	Beta	t.	Sig.
Constant	1.572	.484		3.249	.001
Immersion	.620	.038	.800	16.317	<.001

Customer satisfaction $R^2=.640$, $F=266.238$, $P < 0.05$

The results show that immersion has a significant impact on customer satisfaction as the p-value is 0.003 less than 0.05. Therefore, H4 is accepted.

Table 8

Regression Analysis For The Effect Of Presence On Customer Satisfaction

Variable	B	Std. Error	Beta	t.	Sig.
constant	2.036	.489		4.164	<.001
Presence	.362	.024	.779	15.197	<.001

Customer satisfaction $R^2=.606$, $F=230.943$, $P < 0.05$

The results show that the presence has a significant impact on customer satisfaction as the p-value is <.001 less than 0.05. Therefore, H5 is accepted.

Table 9

Regression Analysis For All The Required Elements For The Mediating Variable

Variables	B	Std. Error	Beta	T value	Sig.
Constant	.616	.509		1.209	.228
The use of VR	.092	.034	.176	2.695	.008
Immersion	.364	.069	.470	5.299	<.001
Presence	.118	.044	.253	2.646	.009

Customer satisfaction $R^2=.689$, $F=109.226$, $P < 0.05$

Upon careful examination of the tables above, it shows that Table 4, became evident that the use of virtual reality has an impact on consumer satisfaction within the real estate industry. Table 5 shows that the use of virtual reality affects immersion. Table 6 demonstrates the impact of virtual reality on presence.

Table 7 indicates the impact of immersion on customer satisfaction. Similarly, Table 8 demonstrates that the presence has an impact on consumer satisfaction.

Table 10

T-Test Analysis Of Marital Status Variations In Customer Satisfaction

		N	Mean	Std. Deviation	t.	Sig.
Customer satisfaction	Single	78	9.1325	2.02391	-1.206	.777
	Married	74	4.07	1.81170		

The T-test analysis conducted on customer satisfaction specifically testing marital status variations did not reveal any significant, p-value exceeding the value of 0.05, which means that H7 is not accepted.

Table 11

ANOVA Analysis Of Age Variations In Customer Satisfaction

		N	Mean	Std. Deviation	F	Sig.
Customer satisfaction	Under 20	8	7.7917	2.37003	1.834	.143
	20-30	48	9.4792	2.12817		
	30-40	54	9.3457	1.50466		
	Above 40	42	9.3810	1.92646		

The ANOVA analysis conducted on customer satisfaction specifically testing age variations did not reveal any significant, p-value exceeding the value of 0.05, which means that H8 is not accepted.

Table 12

ANOVA Analysis Of Gender Variations In Customer Satisfaction

		N	Mean	Std. Deviation	F	Sig.
Customer satisfaction	Male	78	9.2137	1.99637	.318	.728
	Female	70	9.4000	1.85427		
	I Don't prefer to state	4	9.8333	2.15166		

The ANOVA analysis conducted on customer satisfaction specifically testing gender variations did not reveal any significant, p-value exceeding the value of 0.05, which means that H6 is not accepted.

Chapter 5

Discussion and Conclusions

5.1 Discussion of Findings for Research Questions

This section provides a concise overview of the study's results and explores their relevance to the research questions. The objective of this research was to examine the impact of virtual reality usage on customer satisfaction within the real estate market. The study assesses the role of immersion and presence as mediators between the independent and dependent variables. Furthermore, the correlation between the independent and dependent variables.

Research question 1: Does the use of VR in real estate marketing affect customer satisfaction?

The research findings indicated that the use of virtual reality in the real estate market positively affects customer satisfaction. The findings correlated with the research outcomes of Azmi et al. (2023) which were that there is a significant difference in the atmosphere and house purchase intention between real and virtual environments. The results show that the atmosphere significantly affects pleasure and arousal, where pleasure, in turn, has a significant effect on purchase intention, and arousal showed an insignificant effect on purchase intention in the virtual environment, which leads to a positive effect on customer satisfaction while using VR.

Research question 2: Does VR in real estate marketing affect immersion and presence?

The research findings indicated that the use of virtual reality in real estate marketing positively affects immersion. The findings correlated with the research outcomes of Siddique (2023) which were that to completely comprehend the design, flow, and unique features of the house, prospective buyers have the chance to engage in an immersive and genuine experience. Surprisingly, 3D tours already persuade 44% of prospective buyers to participate more extensively; virtual reality tours amplify this effect in immersive and so on facilitating distant property exploration.

The results of the study showed that virtual reality marketing for real estate had a good impact on presence. The results agreed with Tussyadiah et al. (2018) research findings, which stated that presence is a vital attribute of virtual reality (VR) technology as it directly impacts the effectiveness of an activity in different application scenarios. In VR tours, presence becomes a

psychological state in which an individual is completely absorbed and engrossed in the virtual environment, with little to no consciousness of the external physical world.

Research question 3: Do immersion and presence affect customer satisfaction in real estate marketing?

The research findings demonstrated that immersion has a favorable impact on customer satisfaction. The findings were consistent with the research results of Raptis, Fidas, and Avouris (2018) which stated that immersion involves both active involvement with other participants and the dynamic interplay between the virtual world and the individual. Immersion is a vital factor in virtual, non-physical encounters as it determines the level of involvement, which determines customer satisfaction. The research results indicated that customer satisfaction is positively affected by presence. The results were by the investigation conducted by Bulu (2012) which said that the presence of something was discovered to have a significant impact on satisfaction across different situations.

5.2 Conclusions

In conclusion, the study examined how the utilization of virtual reality (VR) affects customer satisfaction in the real estate industry. It offers vital insights into how emerging technology can improve customer satisfaction. The results validate a strong and positive correlation between the utilization of VR and customer contentment, highlighting the potential of VR to transform the way customers interact with real estate assets. By providing customers with the opportunity to virtually explore properties in a highly immersive and realistic setting, VR can greatly improve their capacity to make well-informed decisions, hence enhancing their general level of satisfaction when purchasing or renting. Additionally, the study also uncovered that the feeling of being fully engaged and present, which are important aspects of VR experiences, have a crucial role in influencing customer satisfaction. The level of immersion, which refers to the extent to which customers feel completely immersed in the virtual environment, was discovered to have a strong positive relationship with their satisfaction levels. Moreover, the sensation of "being there" in the virtual environment, known as presence, amplifies the customer's attachment to the property, resulting in a more authentic and gratifying experience. These findings indicate that the level of immersion and presence in a VR experience directly correlates with the probability of customer satisfaction. In addition, the study found that demographic variables such as gender, age, and marital status do not affect customer satisfaction with the use of VR. This

implies that although VR typically improves customer satisfaction, its impact may not differ among various customer segments.

The study's findings are significant because they help us understand the gaps in the current research. It provides professionals with vital insights and adds to the advancement of theories in this sector. Furthermore, this study highlights the considerable capacity of VR to augment customer satisfaction in the real estate industry through the provision of immersive and highly engaging experiences. Nevertheless, the diverse influence of demographic characteristics implies that a universal strategy may not be adequate, and strategies should effectively exploit the advantages of virtual reality for all customers.

5.3 Recommendations

This section provides explicit guidance based on the conclusions drawn from the study's findings. Real estate agencies should give priority to incorporating virtual reality (VR) technology into their marketing strategy in order to boost customer satisfaction. To optimize the advantages of virtual reality (VR), enterprises must prioritize the development of VR experiences that are highly immersive and capable of producing a strong sense of presence. This will enable potential buyers or renters to thoroughly examine properties before finalizing their decisions. Furthermore, acknowledging the lack of importance of demographic characteristics, it is evident that VR experiences are tailored to a wide range of client groups, guaranteeing that all segments can derive advantages from the technology. Ensuring ongoing training for sales teams on the efficient utilization of virtual reality (VR) and regularly updating the VR material to align with current market offerings will be essential for maintaining elevated levels of customer satisfaction.

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