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# Influence of Virtual Reality (VR) Experience on Customer Purchase Intention in the Real Estate Industry of Pakistan

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**ABSTRACT**

Property technology has introduced the real estate sector to new opportunities, such as the use of virtual reality (VR) technologies by real estate agents for property marketing purposes. Virtual reality will enable a global network of linked digital environments that will integrate commercial activities, commerce, education, entertainment, and social interactions. This study uses data from239 potential buyers to examine how the virtual reality experience (VRE) affects Pakistan-Islamabad real estate buyers; buying intentions. Moderation and mediation effects are analyzed using SPSS PROCESS model 5 and hypothetico-deductive reasoning. This research examines consumer behaviour, cognitive states, personal innovativeness, and VR technology experience. The findings show that virtual reality (VR) improves buyers; property visualization, which increases their purchase intentions. These results imply that real estate VR technology meets and may improve customer expectations and purchasing intentions. The moderate hypothesis that personal innovativeness has no statistically significant impact is rejected since it hardly appears. VR should be combined with other novel technologies and examined for its long-term implications on customer purchase intention to ensure effective marketing.



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## Introduction

Understanding customer needs and adapting to knowledge-based economies is essential in today's fast-changing marketing environment. Technology is helping businesses and institutions reduce customer wait times, perform new market research, access customer databases faster, and improve

customer connections (Pestek & Sarvan, 2020). These innovations have changed market dynamics and customer brand perceptions (Wang et al., 2022). Various marketing tactics have helped established and growing organizations target clients and boost brand engagement.

Modern technology is increasingly changing business, especially marketing. For instance, virtual reality (VR) technology revolutionizes the customer experience by providing immersive purchasing platforms (Onyesolu & Eze, 2011). Businesses are using VR to stand out and compete, with the worldwide VR industry expected to reach $44.7 billion by 2025 (Statista, 2021). VR is growing in developing economies like Pakistan, particularly in real estate.

Pakistan's real estate industry is growing despite economic constraints, with firms using VR to sell homes and attract customers. However, academic study on VR's influence on Pakistan's real estate market is scarce. To address this gap, this research investigates how VR technology affects Pakistani real estate customer purchase intention. This study examines customers' cognitive states and personal innovativeness to determine marketing strategies and improve customer purchase intention. The study aims to determine how VR affects consumer purchase intentions, how VR experiences affect consumers' cognitive states, how cognitive states affect purchase intentions, and how personal innovativeness moderates the relationship between VR and purchase intentions. For theoretical and practical reasons, our study contributes to the literature on virtual reality experiences and customer purchase intentions and provides vital information to Pakistani real estate enterprises.

## LITERATURE REVIEW

### Introduction

Businesses must adapt to digitalization in the Fourth Industrial Revolution to compete in a fast-changing digital economy (Tang et al., 2022). The Fourth Industrial Revolution requires businesses to digitize their models to be competitive in a fast-changing digital market. Technological convergence merges the physical, digital, and biological realms in the Fourth Industrial Revolution. This revolution goes beyond technical automation and changes how firms run and manage business operations (Hsiao et al., 2024). Digitization promotes development and sustained competitiveness but poses challenges and uncertainty, especially for EU and Indian companies. This adaptation needs to be more consistent and complex. Digitization creates challenges and uncertainties, especially for EU and Indian businesses, but it also promises growth and sustained competitiveness. The rapid pace of technological advancement encourages companies to critically evaluate their preparedness for transformation (Halaburda, 2024).

Digitization influences all company sectors, making it essential in the Fourth Industrial Revolution. Adaptation encompasses technical, strategic, and human resource adjustments. The transformation brings many possibilities, but firms must manage a complicated terrain of risks and uncertainties (Wei et al., 2021). To be competitive, businesses must nurture a digital mentality, develop skills, and adopt new business models and tactics (Sharma & Shanmugaboopathi, 2022). Halaburda (2024) analyzes how digital platforms affect non-tech companies during the early digital business revolution. Innovation's worldwide influence on digitization emphasizes enterprises' need to adapt to a fast-changing global environment (Qing et al., 2022). Enterprises

must strengthen digital skills to survive and grow in the digital revolution. Entrepreneurs lead the digital revolution (Steininger, 2018), changing company dynamics.

VR improves user experiences and cognitive function (Grudzewski et al., 2018). Immersive VR enhances cognitive diagnosis and rehabilitation (Hsiao et al., 2024), transforming training and therapeutic practises (Azarby & Rice, 2022; Ma et al., 2022). VR improves cognitive function and teach (Xia et al., 2023), showing its potential across industries. Immersive VR experiences are available on independent and tethered devices (Branca et al., 2023). VR, unlike AR, separates users from physical reality, offering unprecedented consumer interaction and marketing options (Chaffey & Ellis-Chadwick, 2019). VR's exponential expansion offers unparalleled consumer involvement and marketing innovation (Ratmono et al., 2024). VR hardware assessments include performance, user happiness, and application-specific needs. As they do not need a PC, standalone VR devices are mobile and easy to use, but they may have limited processing power and a complex virtual world (Branca et al., 2023). However, tethered devices may use PCs' computing power to create immersive, rich images and complicated interactions. Despite technical differences, standalone VR can achieve acceptable performance and user experience without affecting usability or tracking accuracy with proper optimisation (Ratmono et al., 2024). Moreover, particular applications, such as cultural heritage, healthcare, education, and Autism spectrum disorder (ASD) therapy, might impact VR hardware choice since immersive quality, comfort, and usability affect user satisfaction (Chaffey & Ellis-Chadwick, 2019).

VR gear assessment must balance technical capability with the use case. Tethered devices perform better graphics, while optimized standalone devices are more mobile and deliver appropriate experiences. Hardware requirements depend on the application's context to ensure user happiness and VR success, such as cultural heritage discovery, healthcare, education, or ASD therapy (Ratmono et al., 2024).

Virtual reality may improve healthcare, education, and marketing, creating immersive experiences that change customer behaviour (Nava & Jalote-Parmar, 2022). VR improves psychological well-being and customer engagement by imitating real-world settings (Gotthardt et al., 2023), suggesting it could influence marketing (Foroudi et al., 2017). Virtual marketing is targeted and quantifiable, but security and privacy are problems (Shelkovyi, 2023). Modern marketing strategies increasingly use virtual marketing platforms to increase customer engagement and revenue (Turchyn & Ostroverhov, 2019). Recent VR research suggests it may mimic real-life behaviors, benefiting psychology, education, and training. A consumer-focused VR study recreates virtual purchases, highlighting the need for further research.

VR has been examined for its self-improvement and social impact, proving its adaptability beyond entertainment (Wei et al., 2021). The digital revolution has transformed marketing communication, with VR delivering immersive information. VR marketing is new, but its efficacy and emotional benefits remain uncertain. VR marketing could enhance consumer engagement and perception, allowing companies to communicate with customers in new ways despite cost and content problems (Wang, 2023). The real estate market is quickly adopting it to enhance user experiences and decision-making. Understanding how VR affects consumer behavior greatly influences real estate purchasing intentions. Upgraded VR equipment with high resolution and display quality

improves user experiences, customer engagement, and sales conversions (Wei, 2020). Research reveals that VR influences customer purchase intention in numerous ways. VR creates realistic retail experiences that combine online and physical benefits, influencing purchase intention. VR may affect customer attitude, emotions, presence, and purchasing intentions. Research indicates that the VR environment significantly affects emotions and purchasing intentions. Others have shown that sensory design elements like navigation and product design affect VR user experiences and preferences. Additionally, customer technical and psychological assessments like perceived value and enjoyment positively affect purchase intentions for VR service technology. Product engagement alters emotions but not purchase intentions. The VR product setting and user gender may not affect purchasing intent or enjoyment (Wang, 2023). This shows VR experience and consumer purchase intention are complex and affected by various factors. VR, customer attitudes, sensory design, and psychological perceptions affect purchase intention. Virtual reality's product integration needs and the effects of product engagement are still up for discussion. Marketers aiming to increase consumer engagement and sales using virtual reality must have a firm grasp of these characteristics. Studying how the cognitive state mediates the association between VR experience and real estate purchasing intention is interesting. VR experiences may influence purchase intentions based on cognitive state, encompassing information processing, emotional responses, and mental imagery.

VR experiences increase property knowledge, which mediates the favorable association between VR property visits and behavioral intentions. Since VR evokes joy, satisfaction, and feeling, it may increase visit intentions. Subjective emotions are subjective cognitive mediators between VR experience and purchase intention. Immersive VR technology may boost positive feelings and the user experience (Yang, 2024). However, other research suggests that real and virtual emotions are comparable. This shows the complexity of cognitive state as a mediator, indicating that VR's effect on cognitive state and purchase intentions may vary depending on context and execution. Cognition mediates the relationship between VR experience and real estate purchasing intention. Enhancing knowledge and affective responses through VR experiences can positively influence purchase intentions. The level of this mediation may depend on the VR experience and customer variations. Understanding this link and optimizing VR real estate marketing applications requires further investigation (Schroeder, 2008; Drigas et al., 2022).

Personal innovation seems to moderate the virtual reality experience and customer purchase intention. Personal innovation seems to moderate the virtual reality experience and customer purchase intention (Zhang et al., 2024). Personal innovativeness in the IT domain (PIIT) moderated the link between perceived need and purchase intention, showing that more significant PIIT persons are more inclined to buy based on perceived need (Steininger, 2019). The online shop web environment also affected customer cognitive innovativeness, with individual-level uncertainty avoidance modulating the link between cognitive innovativeness and new product purchase intention in e-commerce.

Considerations of personal innovativeness across the consumer experience reveal contradictions or intriguing truths. Personal innovativeness affected the omnichannel consumer experience pre- and post-buy but not during purchase, impacting reuse intention. Further, personal innovativeness increased online purchase intention and decreased consumer perceived risk. These data imply that

personal innovativeness may differ by customer journey stage and cognitive state. Organizations should target consumers' innovativeness to increase purchase intentions while building marketing tactics and customer experiences.

Zhang et al. (2024) find that personal innovativeness strongly impacts the omnichannel consumer experience, influencing reuse intention, but not directly during purchase. Bilgen and Zoghi (2017) found that personal innovativeness boosts online purchase intention and lowers consumer risk. Research shows that personal innovativeness may alter real estate client behavior and intentions. Understanding customer behavior, especially in real estate, is crucial. The Uses and Gratifications theory states that customers actively seek technology that meets their demands (Geng et al., 2024). The VR experience, cognitive state, and personal innovativeness are used to examine Pakistani real estate purchase intentions. This strategy helps academics and industry professionals understand and apply real estate consumer behavior dynamics. The Uses and Gratifications (U&G) theory explains why individuals actively seek out particular media to suit their needs (Filipovic, 2012).

According to Filipovic (2012), audiences pick media based on their interests and desired gratifications, such as usefulness, intention, and resistance to influences. The theory applies to TV, newspapers, video games, the Internet, and family communication (Child & Haridakis, 2017). Family communication researchers have criticized U&G theory for methodological issues and a need for greater adoption, even if it adequately explains media use (Child & Haridakis, 2017; Filipovic, 2012). This concept includes internet-specific gratifications like social happiness (Stafford et al., 2004). In social network consumer behavior, online engagement and arousal mediate social gratifications and use behaviors (Huang et al., 2014). Most consumer behavior theories and studies presume researchers can consciously explain their thoughts, emotions, and behaviors. They presume people can correctly disclose their inner emotions and intentions. The complexities and unconscious influences that drive human behavior may need to be assumed. Recent advancements in psychology and behavioral science have challenged this mainstream paradigm and explored new ways to explain human behavior. This research uses the Uses and Gratifications theory (UGT) to explain why individuals actively seek out particular technology to suit their needs (Geng et al., 2024). UGT emphasizes that incentives and rewards determine media and technology usage. Studies do not explicitly test the U&G theory in VR real estate marketing, but its ideas may be extended.

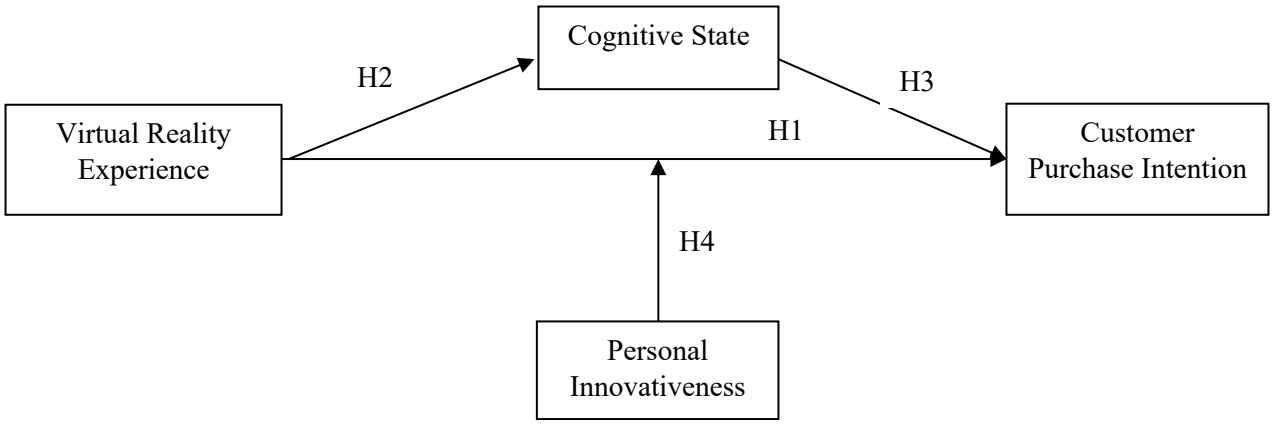
The U&G hypothesis states that media users want certain gratifications, and VR improves consumer experience and purchase intentions. The U & G hypothesis helps academics understand how user gratifications impact VR real estate marketing purchase intentions. VR experience, cognitive state, personal innovativeness, and real estate purchase intention are studied. Although VR tour customers ignore these traits, they are crucial for technical recognition (Nieradka, 2019). According to the uses and gratifications study, imaginative individuals are eager learners and more open to uncertainty, which improves intent. VR experiences, cognitive states, personal innovativeness, and real estate purchase intents are examined in this research (Schroeder, 2008; Drigas et al., 2022). Many studies use the Uses and Gratifications (U&G) theory to study VR incentive cognition and purchasing intentions. Personal innovation may affect these connections. VR experiences may meet customers' entertainment, knowledge, and social needs, impacting their enjoyment and immersion, according to research. Interactive enjoyment encourages purchases in VR tourist e-commerce platforms. Entertainment is key to virtual visitors' satisfaction and propensity to visit the suggested place (Geng et al., 2024). Personal innovation, especially

technological readiness, moderates the association between subjective well-being and VR tourist behavioral intention, indicating optimistic and inventive individuals utilize VR more. Contradictions or intriguing facts arise while assessing personal innovation. It usually encourages technology adoption, although its consequences vary. Previous VR supermarket study indicated that product engagement, not personal innovation, improves emotions and buy intentions. The U&G hypothesis explains how VR impacts homebuyers' cognition and intentions. VR may enhance experience and educate, influencing purchase decisions, according to the hypothesis. Personal innovation has varying effects but generally modest. These results may assist real estate agents influence consumer behavior using VR. The Uses and Gratifications Theory (UGT) says media satisfy desires. Real estate professionals utilize VR to see properties and create immersive experiences to help them make decisions. Studies show that VR improves client attitudes and behavior toward real estate by providing accurate property information. VR enhances website and property visitation, which boosts property sales. Virtual visitors desire information, entertainment, and social interaction, like real estate purchasers who demand extensive property displays. VR real estate technology meet UGT consumer information, entertainment, and engagement needs (Wei, 2020). These technologies increase customer experience and change purchasing intentions and behaviors, transforming real estate agents' and marketing tactics. Research implies VR may improve real estate marketing consumer happiness and sales efficiency (Azmi et al., 2022).

This study proposes and tests a theoretical model that incorporates Uses and Gratifications theory, VR experience, cognitive state, and Personal Innovativeness to address a research gap. It studies VR customer purchase intention based on virtual presence, experience value, purchasing benefits, and cognitive state value. Personal innovativeness moderates Uses and Gratifications theory-based rational decision-making in the research. It offers valuable insights for academics and practitioners, enhancing understanding of consumer behavior and purchase intentions, especially in the real estate industry of Pakistan.

## Theoretical Framework

### Virtual Reality Experience at Real Estate Sector




### Hypotheses

**H1:** The Virtual Reality (VR) experience has a significant positive impact on consumer purchase intention.

**H2:** The Virtual Reality (VR) experience significantly positive influences cognitive state.

**H3:** The Cognitive state significantly positive affects consumer purchase intention.

**H4:** Cognitive state mediates the relationship between Virtual Reality (VR) experience and consumer purchase intention.

**H5:** Personal innovativeness moderates the relationship between cognitive state and customer purchase intention.

# RESEARCH DESIGN

### Research Approach

Positivism against interpretivism, quantitative versus qualitative, induction versus deduction, and exploratory versus confirmatory paradigms are information systems and social science research techniques. Paradigms use assumptions to provide a philosophical framework for interpreting the world. Academically, a paradigm guides professionals by highlighting significant challenges in a discipline, fostering the creation of models and theories to empower practitioners to address these challenges, setting standards for methodologies, instruments, and data collection tools to address these challenges, and providing principles, procedures, and methodologies to be consulted when similar.

### Instrument Formulation

The elements of this study model were based on previous research. Then, those characteristics were changed for real estate VR experiences. This study thoroughly reviewed relevant literature to ensure the research hypothesis was well-grounded and relevant. Multiple variable scales shaped an in-depth survey for data collection.

For clarity and accessibility, we developed a table summarising the literature sources for each variable item and coded each variable in this research. This method detected and resolved all issues while simplifying the research framework's management.

| Measurement Variables | Source | Number of Items | Type of Variable |
|---|---|---|---|
| Virtual Reality Experience (VRE) | Usoh et al. (2000) | 6 | Independent |
| Cognitive State (CS) | Chertoff et al. (2010) | 4 | Mediation |
| Personal Innovativeness (PI) | Hung et al., (2003) | 4 | Moderation |
| Purchase Intention (PR) | Klein et al, (1998) | 4 | Dependent |

This investigation used existing research measuring methods. Users' sensory and VR evaluations were documented using questionnaires. Usoh et al. (2000) created the six-question Slater-Usoh-Steed (SUS) questionnaire to assess three virtual physical presence themes. Chertoff et al. (2010) identify these themes as the user's feeling of presence in the virtual world, how much it becomes their immediate surroundings, and how much it is recalled as authentic.
This research used four Hung et al. (2003) metrics to measure personal innovation. We used six Chertoff et al. (2010) questionnaires to assess cognition. Finally, this study assesses purchase intentions using the products of Chertoff et al. (2010).

The virtual reality experience (VRE) research project focuses on the sensation of presence, dominant reality perception, and memory of the VRE as a 'location.' In another research component, a five-point Likert scale assessed personal innovativeness, cognitive state, and purchase intentions. Numbers on the scale range from "strongly disagree" to "strongly agree."

Additionally, the scale includes the following: On the scale, "1" indicates "strongly disagree,""2" indicates "disagree,""3" indicates "neutral,""4" indicates "agree," and "5" indicates "strongly agree." The study asked the research participants to complete an English-language questionnaire during data-gathering. A questionnaire was developed particularly for those working in the real estate sector that uses virtual reality technology. The purpose of the data-gathering process is to carry out an empirical test of the hypotheses that have been developed and to advance across the different stages of the research process.

## Unit of analysis

This research analyzes real estate company customers that utilize VR for marketing. Virtual reality is used to understand their buying intent. Consider how VR experiences affect customer behavior to discover how VR affects real estate consumers' purchase intentions for marketing reasons.

### Population

Pakistani real estate professionals with direct expertise in virtual reality technology are the target audience for this study. Real estate accounts for around 3% of Pakistan's GDP (Khuong et al., 2021), making it a major GDP contributor. VR is becoming increasingly popular in this area for marketing, showing properties, and enhancing customer experience. This research examines Pakistan's virtual reality-enabled real estate business.

### Sampling

Convenience sampling uses participant availability, not chance. This study used VR-experienced real estate agents to give relevant consumer purchase intention data. This study used VR-experienced real estate agents to give relevant consumer purchase intention data. The sample included four prominent Pakistani real estate companies, including Eighteen and Imraat, who use virtual reality for marketing. These brands represent real estate well. They represent the company effectively in the market.

## Sample Size

The sample size of this study was based on statistical power and demographic representation. Green (1991) provides sample size guidelines for regression analysis. We use the formula $N > 50 + 8m$, where N is the minimum sample size and m is the number of independent variables, when there are numerous independent variables. This research used the formula $N > 104 + m$ for a single independent variable.

Given that this research focuses on a single independent variable, the latter formula was used to calculate the minimal sample size. A sample size of 300 was chosen to make the data more accurate and give a more complete picture of the whole community. The research seeks to enhance the statistical analysis and reduce sampling mistakes by surpassing the minimum sample size requirement. This will provide more dependable insights into customers' purchasing intention towards VR services in the real estate industry. While the sample size is carefully chosen to provide appropriate representation, the findings should be interpreted within the sample and may not apply to the whole Pakistani real estate business.

## Sample Design

Convenience sampling was used for this investigation. Convenience sampling selects individuals based on their availability rather than random sample. This research may use this strategy because of practicality and availability to real estate VR experts.

This research selected real estate professionals with virtual reality expertise using a simple approach. The study seeks comprehensive and valuable data to understand better the relationship between virtual reality technology features and real estate customers' purchasing intentions. This research methodology is done by targeting experts and knowledgeable individuals.

## Data Processing and Analysis

The questionnaire performs similarly to the tool used by researchers to collect the required data in a numerically measurable format. This enables them to analyze the data using statistics. Questionnaires help collect data for an explanation study, and the authors preferred utilizing them in their work. The decision was to utilize an Internet-based questionnaire, with participants providing their responses online when prompted. It was crucial to choose a questionnaire that would gather data quickly and reliably and send it to Excel and SPSS for analysis. The authors used an online, self-administered questionnaire. These surveys are easy to fill out, allowing researchers to gather and analyze their data. Participants received survey responses using Google Forms. Its ability to overcome schedule constraints was a crucial element in its selection. Google Forms features question templates, unlimited replies, and a simple way to convert responses to an SPSS-compatible Excel sheet. This ensures that the data flow for analysis is error-free. In this study, the research instrument was designed to include many purchasing intention factors.

Each instrument question is designed to be assessed using a five-point Likert scale ranging from "strongly disagree" to "strongly agree." Numerical values were assigned to reflect different degrees of agreement or disagreement on this scale to understand respondents' viewpoints better. Numerical values are discussed below: "1" means "Strongly disagree,""2" means "Disagree," and

"3" means "Consider" From a "Neutral" perspective, "3" changes. "4" signifies "Agree," while "5" means "Strongly agree." This rigorous approach ensures that the instrument can gather and evaluate various attitudes and beliefs regarding purchasing. I systematically visited important real estate establishments while collecting data. The open houses conducted by GRANA.com and Eighteen in Islamabad, Pakistan, are well-known in the business. These experiences allowed me to try VR in real estate marketing. Visitors arrived with carefully chosen virtual reality sets to explore a variety of residential and corporate buildings. Prospective purchasers might use VR simulations for touring houses digitally, analysing architecture, and imagining themselves in these places. I used a planned method to collect customer feedback. To retain my professionalism, I politely asked people to participate briefly in the research study. Respondents were taken via a designed Google Forms questionnaire on their devices. The technique allowed real-time feedback and meaningful engagement with customers using virtual reality technology for real estate exploration. I inquired about their perspectives, preferences, and experiences with virtual property tours using both open-and structured questions.

By adding these valuable insights to the overall research framework, I aimed to improve our knowledge of the complex interactions between virtual reality experiences and purchase intention in the real estate industry. This first-hand data-gathering method allowed for the capturing of varied ideas, strengthening the study's empirical base, and contributing to the progress of knowledge in this rapidly expanding subject.

## Analysis and Results

The primary methods for analyzing quantitative survey data are descriptive and inferential statistics (Berkeley et al., 2009). Descriptive statistics summarize the collected data, giving researchers a brief overview and enabling them to "offer a different context, a more detailed picture, or an improved description for examining the phenomenon of interest". To better understand the purchase intentions of users of Virtual reality technology, a descriptive analysis will be performed on the demographic information gathered by the questionnaire. This method summarizes and visualizes data to offer a more complete understanding of sample features. Inferential statistics are vital for hypothesis testing and acquiring inferences about a population from a sample (Tang et al., 2022). This enables researchers to conclude larger populations using data from a representative sample. This research used inferential statistics to draw inferences from the data by testing the hypotheses. All analyses will be conducted using the statistical analysis program SPSS, which ensures precise and reliable findings (Table 5).

**Table 5**

| | **Characteristic** | **Frequency** | **Percentage** |
|---|---|---|---|
| **Age** | 21 – 30<br>31 – 40<br>41 – 50<br>Above 50 | 105<br>139<br>28<br>11 | 35.8<br>47.4<br>9.6<br>3.8 |
| **Gender** | Female<br>Male | 152<br>141 | 51.9<br>48.1 |

| | | | |
|---|---|---|---|
| **Education** | Master<br>Bachelors<br>HSSC | 54<br>212<br>27 | 18.4<br>72.4<br>9.2 |
| **Real Estate Companies** | Graana<br>Eighteen | 163<br>130 | 55.6<br>44.4 |

## Empirical Finding and Analysis

This section describes the empirical findings and analysis of the quantitative data. The chapter begins with a presentation of the reliability analysis results, followed by a detailed descriptive analysis. The next section addresses the correlation and model analysis results. Finally, the results are reported for the hypothesis testing.

Reliability analysis

In this study, Cronbach's alpha was used to analyze the reliability and internal consistency of both individual elements within the suggested research model and the model as a whole. A Cronbach's alpha value of less than 0.70 indicates doubtful data dependability (Trafimow, 2017). The closer the Cronbach's alpha value is to 1.0, the better the internal consistency of the questions regarding the component under examination. It is vital to highlight that the authors adhered to a precise rule for evaluating Cronbach's alpha, emphasizing the requirement of utilizing summated questions for each element rather than individual questions. According to Trafimow (2017), this is because Cronbach's alpha does not provide reliability estimates for single items.

Reliability Analysis

During the initial data collection phase, 293 valid responses were collected, significantly exceeding the recommended minimum sample size. Subsequently, full reliability research was performed, with Cronbach's alpha coefficients determined for each element in the research model and the model as a whole.

The study discovered that while some individual factors had Cronbach's alpha coefficients somewhat lower than the usual criterion of 0.7, the overall model and most components demonstrated sufficient reliability. This indicates that the suggested research model is appropriate for attaining the study's aims, including the possible inclusion of mediation and moderation factors.

| **No.** | **Factors of the Proposed Research Model** | **Cronbach's Alpha** | **N of Items** |
|---|---|---|---|
| **1** | Virtual Reality Experience (VRE) | .746 | 6 |
| **2** | Cognitive State (CS) | .672 | 5 |
| **3** | Personal Innovativeness (PI) | .677 | 4 |
| **4** | Purchase Intention (PR) | .641 | 4 |
| **5** | Cronbach's Alpha for overall model | .828 | 19 |

Correlations

It is essential to mention that the interpretation of Cronbach's alpha values may change depending on the research context. Some scholars suggest that Cronbach's alpha values as low as 0.6 can still imply appropriate reliability, particularly in investigations where the measuring tools are sophisticated, or the structures under investigation are abstract. As a result, despite several variables falling below the traditional criterion, the obtained data were credible within the context of this study (Table 6).

**Table 6 Correlations**

| | | VR | CS | PR | PI |
|---|---|---|---|---|---|
| VR | Pearson Correlation | 1 | | | |
| | Sig. (2-tailed) | | | | |
| | N | 293 | | | |
| CS | Pearson Correlation | .488** | 1 | | |
| | Sig. (2-tailed) | .000 | | | |
| | N | 293 | 293 | | |
| PR | Pearson Correlation | .313** | .264** | 1 | |
| | Sig. (2-tailed) | .000 | .000 | | |
| | N | 293 | 293 | 293 | |
| PI | Pearson Correlation | .376** | .556** | .170** | 1 |
| | Sig. (2-tailed) | .000 | .000 | .003 | |
| | N | 293 | 293 | 293 | 293 |

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

**Testing Model 5 SPSS Process**

After descriptive statistics and correlations among variables were inspected, the moderating role of Personal innovativeness and the mediating role of Cognitive State were tested using Hayes's (2013) PROCESS macro for Spss (model 5). PROCESS procedure presents bootstrap confidence intervals (CIs); this research examines if the construct of Virtual Reality Experience has an **indirect effect** through Cognitive State on the construct of Purchase Intentions. Further, the moderating effect of Personal Innovativeness and the linkage between Virtual Reality Experience and Purchase Intention are also assessed.

Spss Model 5 Y is the dependent variable, X is the independent variable, M is the mediating variable, and W is the moderator. The model's description includes the various variables. This research wants to examine if the construct of Virtual Reality Experience has an indirect effect through Cognitive State on the construct of Purchase Intention. Further, the moderating effect of Personal Innovativeness and the linkage between Virtual Reality Experience and Purchase Intention are also assessed.

Virtual Reality towards Cognitive State

**Outcome Variable:**

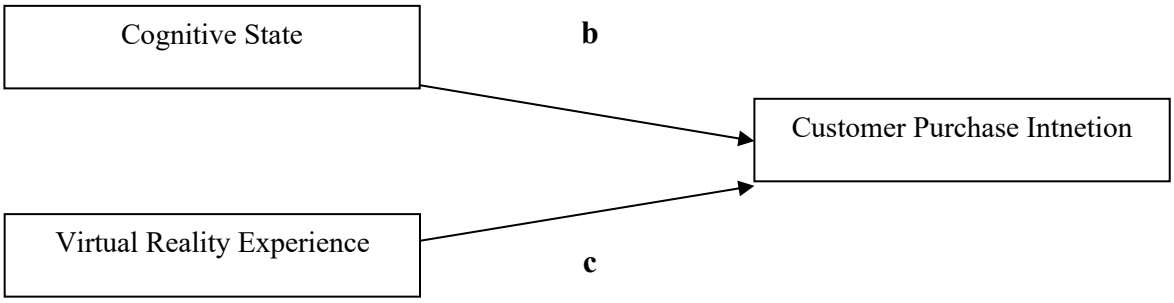

**Table 7 Cognitive State**

| Model Summary | | | | | | |
|---|---|---|---|---|---|---|
| R | R-sq | MSE | F | df1 | df2 | p |
| 0.4882 | 0.2383 | 0.5263 | 91.0533 | 1 | 291 | 0 |
| Model | | | | | | |
| | coeff | Se | t | p | LLCI | ULCI |
| Constant | 3.4089 | 0.0424 | 80.4354 | 0 | 3.3255 | 3.4923 |
| VR | 0.4813 | 0.0504 | 9.5422 | 0 | 0.382 | 0.5805 |

**Model Summary**

The R value of 0.4882 indicates a sensible positive correlation between the predictor variables (such as Virtual Reality and Cognitive State) and the outcome variable Customer Purchase Intention. The R-Sq value of 0.2383 suggests that approximately 23.83% of the variance in the outcome variable can be explained by the predictor variables in the model. This is path **"a"**. Virtual Reality Experience has a significant impact on Cognitive State with a coefficient (b) of 0.4813. This means that for every unit increase in Virtual Reality, Cognitive State is expected to increase by approximately 0.4813 units. The t-value of 9.5422 for Virtual Reality Experience indicates that this coefficient is statistically significant, suggesting that the impact of Virtual Reality Experience on Cognitive state is unlikely to occur by chance.

**Outcome Variable:**




**PR**

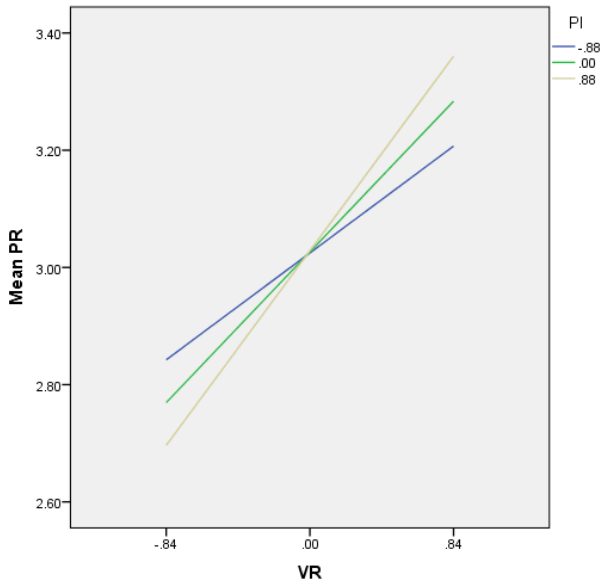
| Model Summary | | | | | | |
|---|---|---|---|---|---|---|
| R | R-sq | MSE | F | df1 | df2 | p |
| 0.3483 | 0.1213 | 0.7685 | 9.9387 | 4 | 288 | 0 |
| Model | | | | | | |

| | coeff | se | t | p | LLCI | ULCI |
|---|---|---|---|---|---|---|
| Constant | 2.4499 | 0.2785 | 8.7975 | 0 | 1.9018 | 2.998 |
| VR | 0.3055 | 0.0749 | 4.0813 | 0.0001 | 0.1582 | 0.4529 |
| CS | 0.1692 | 0.0799 | 2.1172 | 0.0351 | 0.0119 | 0.3264 |
| PI | 0.0021 | 0.071 | 0.0299 | 0.9761 | -0.1376 | 0.1418 |
| Int_1 | 0.1011 | 0.0665 | 1.5201 | 0.1296 | -0.0298 | 0.2321 |
| test (s) of highest order unconditional interaction (s) | | | | | | |
| | R2-chng | F | df1 | df2 | p | |
| X*W | 0.0071 | 2.3107 | 1 | 288 | 0.1296 | |

Additionally, the study revealed a significant impact of Cognitive State on Customer Purchase Intention, with a coefficient of 0.1692, indicating that for each incremental increase in Cognitive State, Purchase Intention is expected to rise by approximately 0.1692 units. This association was statistically significant, as evidenced by the coefficient's t-value of 2.1172 and a p-value below 0.001.

The data model aims to predict Purchase Intention, with an R-squared value of 0.1213 suggesting that around 12.13% of the variation in Purchase Intention can be explained by the predictor variables. The Mean Squared Error (MSE) is 0.7685, and the F statistic, with a value of 9.9387 and a p-value less than .0001, indicates a significant association between predictor factors and Purchase Intention. Moreover, the coefficients for Virtual Reality Experience and Cognitive State are statistically significant, with values of 0.3055 and 0.1692, respectively. However, Personal Innovativeness does not significantly impact Purchase Intention, with a coefficient near zero and a p-value greater than .05. The interaction coefficient between Virtual Reality Experience and Personal Innovativeness, labeled as Int_1, is not statistically significant, indicating no significant improvement in model fit when considering interactions among predictors. Johnson-Neyman analysis was conducted to identify specific regions within the range of the moderator variable where the impact of the predictor variable on the outcome is statistically significant. This analysis helps determine the extent to which the focused predictor influences the outcome.

| DIRECT AND INDIRECT OF X ON Y | | | | | | |
|---|---|---|---|---|---|---|
| Conditional direct effects of X on Y | | | | | | |
| PI | Effect | Se | t | p | LLCI | ULCI |
| -0.8797 | 0.2166 | 0.0781 | 2.772 | 0.0059 | 0.0628 | 0.3703 |
| 0 | 0.3055 | 0.0749 | 4.0813 | 0.0001 | 0.1582 | 0.4529 |
| 0.8797 | 0.3945 | 0.1093 | 3.6081 | 0.0004 | 0.1793 | 0.6097 |
| Indirect effect(s) of X on Y | | | | | | |
| | Effect | BootSE | BootLLCI | BootULCI | | |
| CS | 0.0814 | 0.0383 | 0.0079 | 0.161 | | |




This scatter plot visually represents the relationship between Virtual Reality Experience (VR) and Customer Purchase Intention, with Personal Innovativeness as a moderating factor. The x-axis denotes VR experience, while the y-axis represents purchase intention. Data points are color-coded based on innovativeness values. A positive correlation between VR and purchase intention is evident, showing that as VR increases, so does purchase intention, across all levels of innovativeness. Each level of VR experience corresponds to varying purchase intention values, influenced by personal innovativeness. The dataset covers a range of purchase intentions, innovativeness, and VR experiences, providing insights into how these variables interact. Additionally, the conditional direct effects of VR on purchase intention vary across different levels of personal innovativeness, indicating that the impact of VR on purchase intention changes as innovativeness levels shift. Confidence intervals help gauge the magnitude of these effects. Furthermore, the indirect effect of cognitive state on the relationship between VR and purchase intention is estimated through bootstrapping, providing insights into the influence of cognitive processes on purchase decisions.

**Hypothesis test:**

| | Path | β | p | Hypothesis | (LLCI; ULCI) |
|---|---|---|---|---|---|
| H1 | Virtual reality experience → Purchase Intention | 0.3055 | 0.0001 | Supported | (0.1582;0.4529) |
| H2 | Virtual reality experience → Cognitive State | 0.4813 | 0.0000 | Supported | (0.3820;0.5805) |

| | | | | | |
|---|---|---|---|---|---|
| H3 | Cognitive State → Purchase Intention | 0.1692 | 0.0175 | Supported | (0.0119;0.3264) |
| Mediation | | | | | |
| H4 | Cognitive State → Virtual reality experience → Purchase intention | 0.0814 | 0.0001 | Supported | (0.080; 0.1575) |
| Moderation | | | | | |
| H5 | Personal Innovativeness → Virtual reality experience → Purchase intention | 0.1011 | 0.1296 | Not Supported | (-0.0298;0.2321) |

This study utilized the SPSS PROCESS macro following Hayes's methodology to investigate the moderated mediation hypothesis. By applying the bootstrapping method with 5000 bootstrap samples, a moderation mediation analysis (model 5 of PROCESS) was conducted. This involved calculating 95% bias-corrected confidence intervals (LLCIs and ULCIs) around the estimates of the indirect effects.

Regarding hypotheses, H1 posited a significant impact of Virtual Reality (VR) experience on consumer purchase intention, particularly in the real estate sector. The findings, explaining approximately 23.83% of the variation in purchase intention, support this, with a statistically significant coefficient of 0.3055 indicating the positive influence of VR experience on purchase intent.

H2 explored the influence of VR experience on cognitive state. Results revealed a significant effect, with a beta coefficient of 0.4813 and a p-value less than 0.001, indicating that VR significantly impacts cognitive states.

H3 examined the effect of cognitive state on purchase intention. Supported by a beta coefficient of 0.1692 and a p-value of 0.0351, this hypothesis underscores the importance of focusing on consumers' cognitive and emotional states to enhance purchase intent, particularly in real estate.

In terms of mediation (H4), cognitive state was found to mediate the relationship between collaborative VR experience and purchase intention. A beta coefficient of 0.0814 confirmed this mediation effect, highlighting the role of cognitive states in influencing purchase decisions in response to VR experiences. Lastly, H5 investigated the moderation effect of personal innovativeness on the relationship between cognitive state and purchase intention. While the interaction term was not statistically significant (p-value = 0.1296), further analysis is warranted to understand the nuanced dynamics between these variables.

## Conclusion:

VR experiences increase real estate purchasing intentions by boosting decision-making confidence and satisfaction. VR increases property knowledge, cognitive dissonance, and emotional engagement, improving purchasing intention over traditional media. VR should improve real estate marketing and sales by engaging consumers.

Personal innovativeness influences real estate purchases in numerous ways. However, due to the financial stakes and perceived risks, it affects real estate client behavior less than in other scenarios. Regulations also impact technology adoption rates, like VR. Economic forces, market rivalry, and consumer preferences impact human innovation in Pakistan. Personal innovativeness may not matter in competitive, VR-averse markets. It may affect purchasing intentions in stable economies with growing VR interest. VR technology may enhance real estate consumer experiences despite personal innovativeness. VR can help real estate firms compete and delight customers.

## Implication:

According to UGT, VR enhances sensory experiences, engagement, and purchase intention. It stimulates cognitive processing and emotional responses by meeting real estate buyers' psychological and social demands. VR makes UGT easier to understand, particularly in real estate. VR addresses consumer expectations better than traditional media by enabling immersive and engaging experiences, resulting in more confident and informed purchases. VR property tours increase real estate sales and customer satisfaction. Training may improve VR's real estate potential by increasing intermediary and customer acceptability. VR enables customized marketing and immersive learning, which benefits marketers and consumers. Additional research and implementation are required to optimise the impact of virtual reality on the real estate marketing industry.

## Limitation:

Immersive VR experiences affect tech-savvy customers' buying decisions more than conventional media. The Uses and Gratifications Theory (UGT) proposes that VR may influence purchase choices, particularly among VR enthusiasts. VR satisfaction is variable, necessitating targeted marketing. VR technology has many advantages, but experts need help comprehending its cognitive impacts. Future studies should optimize VR marketing with complicated, tailored social VR systems that could increase community participation, customer behavior, experiences, and dynamic content personalization. Social VR platforms can enhance community engagement and influence consumer behavior. Understanding the interplay between personal innovativeness, VR technology, and regulatory factors is essential for comprehensively understanding real estate customers' purchasing intentions. Moreover, Future research should examine VR's long-term effects on customer behavior and psychology to tailor marketing to varied demographics and socioeconomic characteristics.

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