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Non-Immersive Virtual Reality Technology in Enhancing Customer Experience and Housing Purchase Intention

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KEYWORDS

VR, immersive, SOR model, behavioral intention, housing, SDG.

ABSTRACT

Disruptive technologies have confirmed their role in many fields, there are many businesses around the world using the advancement of this technology to implement their business plans. Since then, the user experience has become much more diverse and interesting. Prior research has demonstrated the efficacy of an innovative form of virtual reality (VR) technology, which is purported to augment the authenticity of simulated settings and experiences. This study seeks to examine the idea that the use of non-immersive VR has an impact on consumers' behavioural intentions, as assessed by the SOR model (Stimulus, Organism, Response). The objective of this research is to gain insights and validate this hypothesis by analysing individuals' experiences. A quantitative research study was undertaken, involving a survey of three hundred participants. The collected data was afterwards analysed using two software programmes. The findings indicate that immersive VR technology offers customers the chance to engage in a multitude of captivating experiences, thereby solidifying its significant role across various domains. Expanding upon the aforementioned advantages, our investigation was expanded to assess the efficacy of non-immersive VR technology and its impact on behavioural intentions in the context of home purchasing decisions.

1. Introduction

The Fourth Industrial Revolution has led to a significant increase in digital transformation and the use of science and technology in various industries, including the real estate sector. In Vietnam, there has been a 4.5% increase in the use of real estate brokerage applications for online transactions in the past two years, coinciding with the ongoing pandemic (Vietnam Report JSC). Blockchain technology, digital platforms, and VR have become prominent trends in real estate transactions, particularly in the realm of real estate transactions. These technical improvements correspond with the United Nations' Sustainable Development Goals (SDGs), particularly SDG 9, which emphasizes the development of resilient infrastructure, the promotion of sustainable industrialization, and the encouragement of innovation. Utilizing these technologies, the real estate sector may enhance resilient and sustainable cities and communities (SDG 11).

Previous research has focused on evaluating the efficacy of immersive VR in enhancing customer experience (Hollebeek et al., 2020). This study aims to determine the extent to which non-immersive VR characteristic factors impact the emotional experience

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of prospective home buyers. The study utilizes the SOR Theoretical Framework (Mehrabian & Russell, 1974), which focuses on the three key factors within the framework: stimulus, organization, and response.

The study identifies three primary themes: a non-immersive application for enhancing the process of experiencing and providing feedback during real estate transactions, and the impact of virtual environments on emotional and immediate reactions. The study uses secondary data sources to develop a model and formulate hypotheses, using both quantitative and qualitative methods to validate the hypothesis. The primary area of investigation pertains to the influence of non-immersive VR technology on individuals' inclination to purchase residential properties, specifically within the realm of real estate. By investigating this aspect, the study also contributes to the development of sustainable cities and communities (SDG 11) by enhancing the application of innovative technologies that can leverage the efficiency and sustainability of the real estate sector.

2. Literature review and hypothesis development

2.1. VR Technology

VR refers to a computer-generated environment that immerses users in a simulated experience, offering a high level of realism and engagement (Ameen et al., 2021). In the virtual environment generated by VR, users will experience full immersion within a three-dimensional space, thereby eliciting real-time sensory stimulation. (Hollebeek et al., 2020). The utilization of VR technology in conjunction with immersive experiences has enabled users to enhance their focus on the experience and expand their understanding of spatial dimensions, resulting in increased levels of satisfaction. VR is dependent on perceptual stimuli, encompassing sensory reactions to stimuli such as auditory, visual, and tactile inputs, as well as the behavioral responses exhibited by consumers (Willems et al., 2019).

VR can be categorized into non-immersive and immersive types. Non-immersive VR involves presenting virtual content on a computer screen without additional equipment, such as keyboards and mice (Zeng et al., 2016).

In recent times, VR technology has found applications across diverse domains such as education, retail, and medicine. Pleyers et al. (2020) study residential products in the real estate sector, focusing on tangible goods and the broader concept of real estate. VR offers distinct attributes for marketing and trading real estate.

VR has offered users a pair of primary tools that contribute to enriching the customer experience, namely visual and functional control (Jiang et al., 2004). According to Jiang et al. (2004), VR allows users to engage with virtual environments through 3D image rotation and virtual control. This enables users to manipulate product images, examine products from various perspectives, and explore product features and functions for functional control.

VR has the ability to enhance the customer experience at every stage of the journey and influence the connection between brand quality and product (Hollebeek et al., 2020). The utilization of VR technology in this domain has been shown to accentuate the favorable influence on the user's experience, fostering a sense of pleasure and motivation to explore various locations. In conclusion, the aforementioned studies underscore the potential of VR to enhance the consumer experience within various products and interactive environments (Ameen et al., 2021).

2.2. SOR Theoretical Framework

The SOR theory, proposed by Mehrabian et al. (1974), focuses on three components: stimulus, organism, and response, relating to inputs, processes, and outputs. They highlight SOR framework's widespread use in sports services, online social networks, workplace, and organizational behavior. The SOR framework is a widely applied and widely used theoretical foundation in consumer behavior research, focusing on elucidating consumer purchase intention. It is a valuable tool for researchers seeking effective connections to VR. (Kim et al., 2019) have been cited in the literature.

The study explores the role of presence, arousal, and pleasure in customers' purchasing experiences in non-immersive VR environments. It emphasizes the incorporation of interactivity, state and emotional factors, and output responses, including attitudes and behavioral intentions towards products. The study aims to broaden the existing theoretical framework and understand the significance of these factors in shaping customers' purchasing experiences.

2.3. Hypothesis development

This interaction encompasses actions such as navigating within the virtual environment, altering one's viewpoint, as well as physically manipulating and relocating virtual objects (Steuer et al., 1992). Three levels of interaction in VR include spatial navigation, environment manipulation, and operating system modification, with spatial navigation being the fundamental level, manipulation being intermediate, and system modification being the highest level. These distinctions have been identified by Zhenhui et al. (2004), and H. Li et al. (2002). Thus, the hypothesis posits the following:

H1: There is a significant difference in customers' assessments of interaction with real estate products between non-immersive VR conditions and photo conditions.

The atmosphere can be understood as a theoretical construct representing the physical presence in a given space, specifically referring to the subjective experience and perception of individuals. The perception of the atmosphere within the simulated environment is subjective and influenced by various sensory experiences, including visual, tactile, and auditory stimuli. The influence of the atmospheric element within the marketing domain holds significant implications for consumer behavior, particularly in relation to intention formation and purchase choices (Chang et al., 2014). Store atmosphere is a strategic instrument influencing consumer behavior, eliciting emotions and driving favorable actions in physical establishments (Azmi et al., 2021). Azmi et al. (2021) found that visual elements, like color, significantly impact a favorable perception of an environment. Virtual tours are increasingly used by real estate agents to interact with clients. Advancements in digital imaging technology, like VR, can facilitate the buying process in the real estate industry (Jiang et al., 2004). Therefore, the content of the hypothesis is as follows:

H2: There is a significant difference in customer evaluation of the atmosphere of real estate products) between non-immersive VR conditions and photos conditions.

Das et al. (2017) found that shopping mall ambiance impacts consumers' emotional states through pleasure and arousal, with information abundance influencing reactions. The impact is amplified in novel settings. They argue that the atmosphere influences consumer behavior, affecting arousal emotion. Organisms, a biological factor, are fundamental components of the SOR framework, affecting enthusiasm, vigilance, and activation (Mehrabian et al., 1974). Perception of pleasure refers to subjective happiness or satisfaction in an environment. (Azmi et al., 2021). Consequently, this study presents two hypotheses, namely H2a and H2b, as outlined below:

H2a: Virtual atmosphere has a positive relationship with the feeling of arousal for customers during the experience.

H2b: Virtual atmosphere has a positive relationship with the feeling of pleasure for customers during the experience.

Presence refers to a user's psychological state of being fully engaged in a mediated environment, resulting in a physical presence within the virtual space. (Slater et al., 2000). Pleyers et al. (2020) investigate the impact of non-immersive VR experiences on virtual presence, revealing that 3D content incorporates authentic materials for a high-resolution visual representation. According to Martínez-Navarro et al. (2019), 360-degree video technology captures real-world images and depicts real-life situations, influencing perception, subjective experience, and behavioral intentions of prospective customers. Presence and supportive tools significantly influence perception and behavior.

H3: The use of non-immersive VR associates with a greater perception of the presence of customers during the real estate experience.

According to Ritter (2014), interaction refers to the psychological and physical correspondence between media content and user experience with simulated content. Interactivity in real estate platforms enhances customer realism, allowing them to experience space and evaluate products effectively. The study explores VR's potential for enhancing consumer virtual tours through interactive features. This aligns with the findings of the previous researchers who also emphasized the importance of these interactions in creating a more immersive virtual environment for users. Interactive real estate products enhance consumer engagement by allowing visualization of properties through VR, enhancing immersion and immersion (Kristofferson et al., 2016). Therefore, the research proposes the following hypothesis:

H4: Interactivity has a positive impact on attitudes toward real estate products during the experience.

According to Tussyadiah et al. (2018), VR technology has revolutionized the real estate sector by providing customers with a sense of presence in a virtual environment. This experience significantly impacts customer enjoyment and satisfaction during product selection processes, as users perceive VR devices as non-existent and respond accordingly. Regarding the concept of post-experience, prior research has demonstrated that the utilization of VR technology enables individuals to virtually visit tourist destinations, thereby aiding in the formation of accurate and realistic expectations regarding the itinerary and overall experience associated with the destination (KA Kim et al., 2019). Subsequently, we formulated a hypothesis:

H5: Feeling of presence during the experience has a positive influence on Attitude toward products.

According to several studies conducted by Willems et al. (2019), it has been found that VR has the potential to enhance the user's sense of presence and foster imaginative experiences. VR has a positive influence on behavioral intentions. In a scholarly article examining the influence of non-immersive VR technology on customers' behavioral intentions towards real estate products. Pleyers et al. (2020) conducted a study and the findings of their research indicated that a greater sense of presence was associated with a higher likelihood of customers intending to visit the store. Subsequently, the research hypothesis is formulated:

H6: The higher feeling of presence results in greater behavioral intention.

According to Tussyadiah et al. (2018), multiple studies in the field of tourism indicate that customers' favorable perceptions of their environment are associated with an increased probability of engaging in visitation activities. Attitude is a pivotal construct within the realms of social psychology and consumer behavior theory. In the research conducted by Pleyers et al. (2020) regarding the utilization of non-immersive VR technology in the real estate sector, it was also observed that the individual's attitude towards the product plays a mediating role in the relationship between presence and behavioral intention. The proposed research hypothesis is presented.

H7: Attitude towards products has a positive relationship with behavioral intention.

The behavioral intention in psycho-emotional behavior is influenced by one's prior experiences. Studies show positive emotions significantly impact online purchasing behavior. (Menon et al., 2002). Purchase intention in retail is a behavioral response linked to pleasure and positive arousal. Emotional responses impact individuals' inclination to approach or avoid environments. According to Ha et al. (2010), store-induced arousal significantly impacts consumer's favorable reaction to emerging technology, influencing exploration and purchase intentions. Online store atmosphere influences consumer arousal, pleasure, and intentional behavior. Azmi et al. (2021) found that VR-enabled real estate marketing increases excitement and arousal, impacting individuals' inclination to purchase residential properties. The proposed research hypothesis is as follows:

H8: Arousal has a positive relationship with behavioral intention.

The process of customers engaging with VR technology elicits the formation of emotions within them. In contrast to unpleasant stores, pleasant stores have a natural tendency to stimulate customers to spend a greater amount of money. Experience-oriented marketing strategies require meticulous decoration design to create a favorable atmosphere, generating profit. High customer satisfaction leads to more favorable product responses, influencing purchase intention and psychological satisfaction. Shopping experiences stimulate pleasure, and technology positively impacts consumer response. Technology's impact on consumer response is also significant (Das et al., 2017;). The research hypothesis is postulated:

H9: Pleasure has a positive relationship with behavioral intention

2.4. Research model

The study model employed in this research is grounded in the SOR framework as originally proposed by Mehrabian et al. (1974). The research model under consideration comprises six independent variables and one dependent variable. The study incorporates six independent variables, namely interactivity, atmosphere, presence, attitude towards

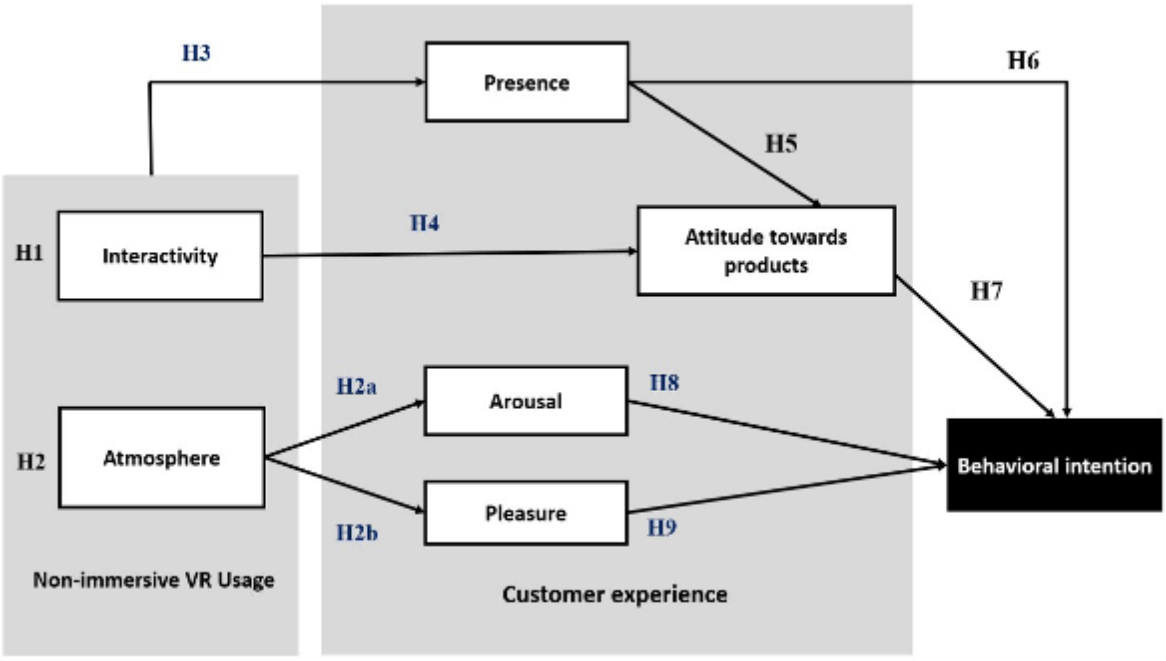

Figure 1. The proposed research model with hypotheses

products, arousal, and pleasure. The behavior intention is considered as one of the dependent variables.

3. Research methodology

3.1. Qualitative research design

The research involved conducting interviews with subject matter experts and individuals interested in VR and real estate. A quantitative questionnaire was administered using the experimental method, which is considered the most appropriate sampling technique for the subject matter. The survey was administered in two distinct conditions using identical questionnaires and protocols.

Experts and participants provided feedback on the research survey. The Smart PLS-4 tool is used to examine fundamental indicators like Outer Loading, Cronbach's Alpha, and Average Variance Extracted to validate the model's adequacy for hypothesis analysis.

3.2. Quantitative research design

The structural model was assessed for multicollinearity using the Variance Inflation Factor (VIF), and adjusted R-square was calculated to understand independent factors' explanations of dependent factors. Interplay between factors was evaluated using P values and the original sample, and the influence of independent variables on dependent variables was assessed using the f2 index and Q2 index. ANOVA was conducted using SPSS to assess disparity between respondents in terms of atmosphere, interactivity, and presence factors.

3.3. Sampling technique

The non-probability sampling technique, based on subjective judgment, is used in research. Two common methods are convenience sampling and judgmental sampling. In judgmental sampling, subjective assessments and judgments are used to evaluate and select subjects. A sample size of 300 individuals, encompassing various age groups, employment statuses, and a shared interest in real estate, was taken into account for the purpose of this study. The selection of participants is contingent on the investigator's understanding of the individuals involved.

Participants were randomly assigned to two groups, each experiencing either viewing photographs or engaging with non-immersive VR. They were provided with a project via a computer interface that accommodates both immersive and non-immersive environments. The participants were prompted to envision the house depicted on the display, and their satisfaction was measured until they reached contentment. The approach aims to enhance efficiency and ensure attendees' participation. In photography, participants can observe various angles of the house through different photographs, while in non-immersive VR, they can navigate through a virtual representation of an apartment using a 360-degree viewing capability.

3.4. Sampling method

Due to the specificity of the experimental method, the sampling approach we decided to use is to survey the respondents through online questionaire. Which, with the application of non-probability sampling techniques, namely convenience sampling and judgmental sampling, we used our individual relationships to have the most reasonable judgment about the selected survey participants. This method will help us choose the appropriate survey subjects, and the survey process will also be more effective.

4. Research results

In relation to the empirical survey, the study employed a Google form as a means of distributing the survey to participants. The research yielded a total of 326 samples, with 194 survey responses pertaining to the non-immersive VR experience and 220 survey forms focused on the photo viewing experience.

4.1. Evaluation of the measurement model

4.1.1. Quality Analysis of observed factors

An 0.708 external load coefficient is required for quality in an observed variable. This indicates that the latent variable accounts for 50% of the variation. Upon comparing results, all observed factors have values greater than 0.7, including the latent variable. Specifically, the factors are as follows:

Atmosphere-2 is the lowest Outer Loading factor, accounting for 70% of the observed variation. Presence-3, with a 0.951 value, accounts for 95% of the observed variation, explaining all variables within the model. Hence, all variables are retained within the model.

4.1.2. Check the reliability of the factors

The data analysis results show that the Cronbach's Alpha coefficient for seven factors exceeds the 0.7 threshold, satisfying reliability criteria. Additionally, all factors in the study have an Average Variance Extracted (AVE) index that surpasses the established threshold of 0.5, demonstrating convergence in the scale used in the research.

4.2. Evaluation of the structural model

4.2.1. Discrimination

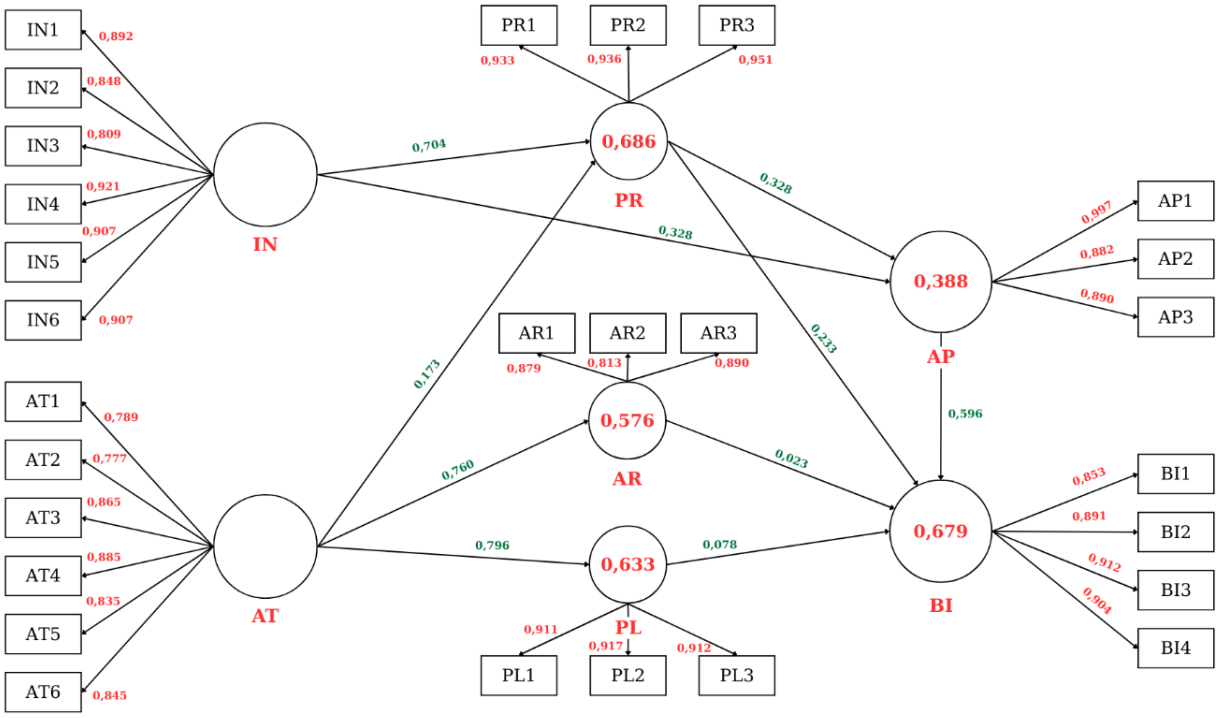

Figure 2. Measurement model results

Table 1. Test results of Cronbach's Alpha and Average variance extracted

Factor	N of Items	Cronbach's Alpha	Quotes	Average variance extracted	Quotes
Interactivity	6	0.942		0.777	
Atmosphere	6	0.912		0.695	
Attitude towards products	3	0.873		0.798	
Arousal	3	0.827	> 0.7	0.742	> 0.5
Pleasure	3	0.901		0.835	
Behavioral intention	4	0.913		0.793	
Presence	3	0.934		0.884	

Henseler et al. (2015) conducted simulation studies to evaluate division value using the HTMT index, which they developed extensively. The HTMT index is increasingly used in research, suggesting a discriminant value between two quantitative variables is ensured when the index is below 1. The study found that all HTMT index values are below or equal to 0.9, ensuring discriminant validity in the model's structure.

4.2.2. Multicollinearity

Hair et al. (2019) suggest that a variance inflation factor (VIF) equal to or exceeding 5 indicates a high likelihood of multicollinearity in a model. They set a specific threshold for assessing the VIF index. If VIF is greater than or equal to 5, multicollinearity is likely. If VIF falls within the range of 3 to 5, it may be present. If VIF is less than 3, no multicollinearity is present. The analysis findings show that all factors exhibit VIF values less than or approximately equal to 3, suggesting that multicollinearity is unlikely.

4.2.3. The explanatory level of the independent variable to the dependent variable

The Attitude towards products factor has an R-square adjusted index of 0.388, with Interactivity and Presence factors accounting for 38.8% of the variability. Atmosphere factors account for 57.6% of the variance in the Arousal factor. Behavioral intention factors, including Arousal, Pleasure, Presence, and Attitude factors, account for 67.9% of the variability. Atmosphere factors account for 63.3% of the variability in the Pleasure factor, and 68.6% in the Presence factor.

4.2.4. Evaluation of the impact relationship

The study found that two instances of the relationship between Arousal and Pleasure have no statistical significance. Arousal and pleasure have a significant impact on behavioral intention, with P-values greater than 0.05. All other cases have P-values below 0.05, indicating statistical significance.

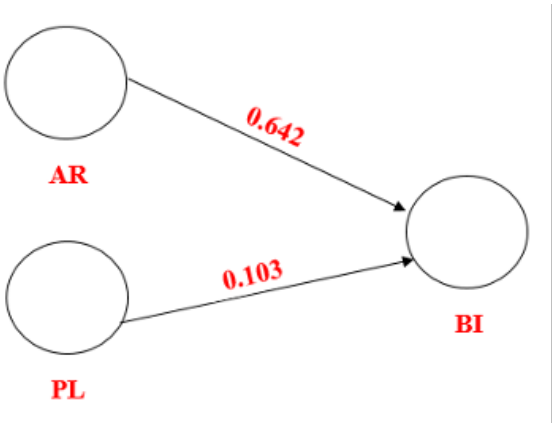

Figure 3. Assessment of the impact relationship

4.2.5. Normalized regression coefficient

The atmosphere factor significantly influences pleasure, with a 0.796 sample index, while arousal has the least impact. Behavioral intention has an initial sample index of 0.023.

4.2.6. Evaluate the impact of the independent factor on the dependent factor (effect size F2)

A value below 0.02 indicates a small effect, while a range of 0.02 to 0.15 indicates a medium impact. A value between 0.15 and 0.35 indicates a medium impact, and a value greater than or equal to 0.35 indicates a high impact.

The F2 index values for the factors of Interactivity and Presence are both 0.058, indicating a limited influence of these factors on the Attitude towards products factor.

The Arousal factor is significantly influenced by the Atmosphere factor, as indicated by the F Square index of 1.365, suggesting a robust effect of the Atmosphere factor on the Arousal factor.

The Behavioral Intention factor is influenced by four factors with an F Square index: Attitude towards products, Arousal, Pleasure, and Presence. Attitude towards products significantly influences behavioral intention, while Presence has limited impact. Arousal and pleasure have minimal or negligible effects. The atmosphere factor significantly influences behavioral intention, with a substantial F Square index of 1.732.

The Presence factor is significantly influenced by the Interactivity factor, as indicated by the high F

Table 2. Comparison of results between groups of respondents

Interactions between factors	Respondents see Photo	Group of respondents watching VR
	Path coefficients	Path coefficients
Attitude towards products impact Behavioral intention	0.710	0.437
Arousal impact Behavioral intention	-0.055	0.091
Atmosphere impact Arousal	0.741	0.702
Atmosphere Impact Pleasure	0.834	0.677
Atmosphere Impact Presence	0.104	0.296
Interactivity affects Attitude toward products	0.370	0.343
Interactivity Impact Presence	0.759	0.473
Pleasure impact Behavioral intention	0.120	0.018
Presence influences Attitude toward products	0.239	0.391
Presence impacts Behavioral intention	0.150	0.346
Factor	Q^2	Q^2
Attitude towards products	0.326	0.370
Arousal	0.542	0.484
Atmosphere		
Behavioral intention	0.342	0.355
Interactivity		
Pleasure	0.691	0.446
Presence	0.684	0.441

Square index of 0.887. Conversely, the Atmosphere factor has a relatively minor impact, as evidenced by the low F Square index of 0.054.

4.2.7. Evaluation of predictive power of factors (q^2)

The researchers suggest Q2 as a metric for evaluating the overall quality of a component model. A Q2 index above zero indicates a commendable structural model, indicating the overall subject matter's quality.

Hair et al. (2019) categorized Q2 levels to determine the predictive capability of a model. Low Q2 values indicate low prediction accuracy, while $0.25 \leq Q2 < 0.5$ indicates average forecast accuracy. High Q2 values indicate high forecasting accuracy. The dependent factors of behavioral intention, pleasure, and presence yielded values of 0.535, 0.524, and 0.602, respectively. The model also exhibited high predictive accuracy when attitude towards products is measured at 0.308 and arousal level at 0.420. Overall, the model demonstrates a high level of predictive capability.

4.2.8. Comparison between two groups of respondents using VR and photo

The study found that respondents exposed to the picture had varying degrees of influence from Atmosphere and Pleasure factors. Arousal and Behavioral intention had the most and least significant impacts, respectively. Pleasure had the highest predictive accuracy, while attitude towards products had the lowest.

Respondents exposed to non-immersive VR found that atmosphere and arousal had the most significant and least significant influence, respectively. Pleasure and behavioral intention had the strongest impact. Arousal had the highest predictive accuracy, while behavioral intention had the lowest.

4.2.9. Analyze the average difference between groups of respondents through three factors Interactivity, Atmosphere, and Presence

The Levene Statistics results indicate a non-uniform variance in the variance of respondents' groups. Welch's determination confirms that all three factors have zero Sig values, indicating a mean difference between the groups.

5. Conclusion

This study addresses the gaps which identified earlier, particularly the limited understanding of how non – immersive VR influences consumer behavior in the real estate context. The findings demonstrate that: (1) Interactivity and atmosphere are critical dimensions of non – immersive VR, directly impacting both cognitive (attitudes) and emotional (pleasure) outcomes; (2) Behavioral intention is shapes by a combination of cognitive and emotional responses, with attitudes acting as a stronger determinant; (3) The unique context of Vietnam, characterized by rapid digital transformation and q growing middle – class demand for real estate, highlights the relevance of innovative marketing tools like VR in influencing consumer decision – making.

5.1. Research scale and level of impact

5.1.1. Research scale

The evaluation results of the measurement model indicate that all observed factors exhibit external load coefficients of Outer Loading that surpass the threshold of 0.7, with values ranging from 0.777 to 0.951. This implies that the explanatory variables in the model under investigation account for approximately 70% to 95% of the variability observed in the factors being studied. Furthermore, it is worth noting that all seven factors included in the model exhibit Cronbach's Alpha coefficients that surpass the established threshold of 0.7. This observation indicates that the factors in question meet the necessary criteria for reliability. Ultimately, the culmination of various factors results in the Average Variance Extracted (AVE) index surpassing the threshold of 0.5, indicating that the scale effectively achieves convergence.

5.1.2. Level of impact

Based on the analysis of the data from the two groups, it can be observed that the Atmosphere factor exhibits the most pronounced influence, while the Arousal factor demonstrates the least significant impact. The identical outcomes were observed among the participants who were exposed to the image. Among the participants who were exposed to non-immersive VR, it was observed that the Atmosphere factor had the most significant influence, while the Pleasure factor had the least impact. The analysis reveals that in all three cases, this factor is deemed to have the most significant influence. Indeed, the immediate environment significantly contributes to the overall perception and value of real estate properties. Additionally, it aids in capturing the attention of customers, regardless of whether they are engaged with immersive or non-immersive VR technology. In relation to predictive accuracy, the observed groups demonstrated elevated outcomes, with the exception of the subset of participants who engaged with non-immersive VR, where the results were merely average.

The analysis of the respondents' experiences indicates a significant influence of the Atmosphere

factor on the Arousal and Pleasure factors, as evidenced by the F2 indices of 1.365 and 1.732, respectively. The Attitude towards products of the two factors is influenced to a small extent by the Interactivity factor. Lastly, it can be observed that the factor of Presence is significantly influenced by the factor of Interactivity, as indicated by an F2 index of 0.887. Conversely, the factor of Atmosphere has a minor impact on Presence, with an F2 index of 0.05. Hence, the factor of Atmosphere exerts a significant impact on the user experience.

5.2. Conclusion

All of the hypotheses in this study have been accepted and none have been rejected. However, it is necessary to consider certain cases as outlined below: In relation to the hypothesis, it is observed that H8 and H9 pertain to the influence of Arousal and Pleasure on the factor of Behavioral intention. However, it is found that there is no statistically significant relationship between these factors. In particular, when evaluating the influence of independent variables on dependent variables using the F2 index, it is observed that the factors of Arousal and Pleasure exhibit minimal or potentially negligible effects on the factor of Behavioral intention. This study demonstrates that the presence of stimulation, pleasure, and excitement during the product viewing experience does not exert a substantial influence on consumer intentions and behavior. In the ANOVA analysis, the mean difference among different groups of respondents will be examined with respect to three factors: Interactivity, Atmosphere, and Presence. This finding demonstrates that three distinct factors have the potential to generate emphasis and distinct characteristics, thereby distinguishing the three groups of respondents.

5.3. Meaning of theoretical framework

The study investigates the impact of non-immersive VR technology on customers' behavioral intentions in purchasing and selling residential properties. It examines the variables associated with VR, their emergence, and their impact on attitudes towards products and behavioral intentions. Non-immersive VR evokes a sense of presence through interaction and atmosphere, significantly impacting customer experience and reactions. This stimulus influences interaction and atmosphere, making VR a significant influence in customer interactions. Upon examining the various components of organisms, it has been determined that stimulus factors are indeed linked to the perception of presence, pleasure, and arousal. The findings of this study highlight the significance of the visual representation of arousal and pleasure factors. The concept of presence has been addressed in numerous prior studies regarding the utilization of VR across various domains, such as tourism, according to Tussyadiah et al., (2018). The focus of this study was to investigate the presence of additional factors related to atmospheric processes, specifically pleasure and arousal. Both hypotheses were found to be supported by the data. This study is focused on investigating individuals' attitudes towards products and their subsequent behavioral intentions. Furthermore, this study provides additional support for the significance of the customer's experiential process during virtual visits, specifically in terms of presence, pleasure, and arousal.

5.4. Research limitations

The study's limitations include a limited sample size, limited expertise in VR, and challenges in accessing comprehensive research support. Additionally, the presentation format for participants did not include all customary factual information found in real estate advertisements. The research team provided two groups with the opportunity to explore a housing project using both photographs and VR technology, focusing on design and style details. VR is increasingly influencing various aspects of daily life, with applications in medicine, education, and the military. However, our research specifically centers on the application of this technology to other fields or industries We argue that mechanically implementing non-immersive VR in such contexts is highly problematic and carries significant risks.

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