COMPARING THE EFFECTS OF VIRTUAL REALITY AND TRADITIONAL VIDEO ON PURCHASE INTENTION FOR RESIDENTIAL REAL ESTATE IN VIETNAM

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ARTICLE INFO

Received: 07/8/2025
Revised: 26/9/2025
Published: 26/9/2025

KEYWORDS

Virtual reality
Telepresence
Real estate
Purchase intentions
Home-buying process

ABSTRACT

This study analyzes the impact of Virtual Reality technology on purchase intentions in the residential real estate market in Vietnam. Data from 312 participants were processed using the PLS-SEM model to evaluate the mediating roles of telepresence, perceived usefulness, playfulness, and perceived quality in shaping purchase intentions. The results indicate that Vietnamese consumers remain hesitant about Virtual Reality and prefer traditional videos when exploring property options. Notably, factors such as telepresence and playfulness show weaker influence on purchase intention in Virtual Reality environments compared to video formats. The study offers a novel perspective in the context of Southeast Asia's emerging markets and highlights that improvements in Virtual Reality image quality and interactivity are essential to enhance consumer acceptance. These findings provide valuable implications for real estate businesses in the process of digitalizing their marketing strategies in emerging markets like Vietnam.

SO SÁNH TÁC ĐỘNG CỦA CÔNG NGHỆ THỰC TẾ ẢO VÀ VIDEO TRUYỀN THỐNG ĐẾN Ý ĐỊNH MUA BẤT ĐỘNG SẢN NHÀ Ở TẠI VIỆT NAM

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THÔNG TIN BÀI BÁO

Ngày nhận bài: 07/8/2025
Ngày hoàn thiện: 26/9/2025
Ngày đăng: 26/9/2025

TỪ KHÓA

Thực tế ảo
Hiện diện ảo
Bất động sản
Ý định mua
Quy trình mua nhà

TÓM TẮT

Nghiên cứu này phân tích tác động của công nghệ thực tế ảo đến ý định mua bất động sản nhà ở tại Việt Nam. Dữ liệu từ 312 người tham gia được xử lý bằng mô hình PLS-SEM nhằm đánh giá vai trò trung gian của sự hiện diện ảo, tính hữu ích, tính giải trí và chất lượng cảm nhận trong việc hình thành ý định mua. Kết quả cho thấy người tiêu dùng Việt vẫn còn e ngại với thực tế ảo, ưu tiên video truyền thống hơn trong quá trình tìm hiểu sản phẩm. Đặc biệt, các yếu tố như sự hiện diện ảo và tính giải trí có ảnh hưởng yếu hơn đến ý định mua trong môi trường thực tế ảo so với video. Nghiên cứu cung cấp góc nhìn mới trong bối cảnh phát triển ở Đông Nam Á, đồng thời chỉ ra rằng chất lượng hình ảnh và mức độ tương tác của thực tế ảo cần được cải thiện để tăng mức độ chấp nhận của người tiêu dùng. Các kết quả này mang lại hàm ý quan trọng cho doanh nghiệp bất động sản trong quá trình số hóa hoạt động tiếp thị tại thị trường mới nổi như Việt Nam.

DOI: https://doi.org/10.34238/tnu-jst.13387

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1. Introduction

In recent years, Vietnam's real estate sector has become a key pillar of the national economy, contributing significantly to Gross Domestic Product (GDP) and attracting substantial investment. This growth mirrors global trends, where real estate is increasingly shaped by digital transformation. Since 2012, over $6.4 billion has been invested globally into real estate technology, with Virtual Reality (VR) emerging as a transformative tool offering immersive, interactive experiences [1], [2].

The COVID-19 pandemic accelerated this shift as social distancing measures prompted Vietnamese real estate firms to adopt digital solutions like VR for property showcasing [3]. While consumer adoption of VR and Augmented Reality (AR) has gained traction, uptake remains uneven; only 20% of industry stakeholders foresee major disruption from AR/VR in property development [4]-[6]. Empirical studies show VR enhances spatial understanding and emotional engagement, shortens transaction time by up to 49%, and improves customer satisfaction [7].

Despite these advances, little is known about how consumers in emerging Southeast Asian markets, particularly Vietnam, respond to VR compared to traditional media formats. Most prior studies have focused on Western or developed Asian contexts, with limited attention to cultural and technological differences [2], [5], [8], [9]. In Vietnam, skepticism about VR persists, possibly due to concerns about quality, realism, and limited user diversity [10], [11].

Given this context, the present study compares the effects of immersive VR and traditional videos on purchase intention for residential real estate in Vietnam. It explores the mediating roles of telepresence, perceived usefulness, playfulness, and quality perception using Partial Least Squares Structural Equation Modeling (PLS-SEM). The research question is: *"How does immersive VR influence consumer purchase intentions compared to traditional video formats in the Vietnamese residential real estate market?"*

By addressing this question, this study contributes empirical evidence to the underexplored area of real estate communication in Vietnam, offering valuable insights for marketers, developers, and policymakers.

2. Materials and Methods

2.1. Materials and hypothesis development

Real estate involves a complex network of investors, financial institutions, households, and developers [12]. Consumer behavior in this sector reflects complex decision-making, shaped by personal traits such as openness and stress [5], and emotional reactions to property evaluations [10]. The COVID-19 pandemic disrupted the market but also accelerated innovation, notably the adoption of Virtual Reality to support remote property exploration [3], [13].

Virtual Reality environments are shaped by psychological concepts such as presence and telepresence, which significantly influence user experiences and perceptions. In this context, four variables, telepresence, quality perception, usefulness, and playfulness, play distinct roles in shaping engagement and purchase intentions. While these variables have been studied in areas like e-commerce, tourism, and gaming [14] - [16], their interplay in real estate, particularly in emerging markets like Vietnam, remains underexplored. Understanding how these factors operate in VR-based real estate settings offers valuable insights for digital transformation in property marketing.

Telepresence is the psychological state of feeling physically present in a computer-mediated environment [17], enhancing immersion and realism in virtual spaces [18]. This sensation contributes to positive user attitudes and behavioral intentions [5].

Quality perception, shaped by system design and interaction, influences overall user experience and purchase intentions [11]. However, the interaction between usefulness and perceived quality in VR real estate settings is still insufficiently studied, especially in markets with limited digital infrastructure.

*Usefulnes*s, as outlined in the Technology Acceptance Model [19], refers to how users perceive a system as improving their performance. In the real estate context, greater usefulness may enhance trust and satisfaction, which in turn boosts engagement [20]. This study led to promote the hypothesis as follows:

H1: Positive usefulness influences quality perception in a real estate environment.

Playfulness, or the sense of enjoyment and engagement in virtual environments [21], is known to increase user interest and favorable attitudes [15]. Nonetheless, the effect of playfulness in serious, high-value decisions like property purchases needs more empirical support [22]. Based on the insights derived from the mentioned variables, the following hypotheses are proposed to examine their impacts on user perceptions and behaviors in the VR environment:

H2: Telepresence positively influences playfulness in a real estate environment.

H3: Positive quality perception influences purchase intention in a real estate environment.

H4: Positive playfulness influences purchase intention in a real estate environment.

Although prior research affirms the benefits of VR in customer engagement and experience, there is limited understanding of its comparative effectiveness against traditional formats like video, especially in high-involvement industries. Given the immersive potential of VR, it is essential to assess whether it significantly outperforms video in shaping consumer responses in real estate contexts [23]. Therefore, the hypothesis is as follows:

H5: Stronger effects are observed among individuals exposed to a VR environment compared to those exposed to a video environment.

2.2. Methods

This research investigates the impact of Virtual Reality technology on the residential real estate buying process and consumer experience in Vietnam. Using a quantitative approach and survey method, the study aims to evaluate public perceptions and behavioral responses to VR innovation, with potential implications for consumer engagement and business strategy. This method enables testing of causal relationships among multiple latent variables and allows generalization to the broader population of homebuyers in Vietnam.

Two questionnaires were designed: (1) traditional video viewing (Q1, online) and (2) immersive VR simulations (Q2, direct, using Samsung VR glasses at survey points across North, Central, and South Vietnam). Data were collected from March to June 2023, a period of stability following the COVID-19 pandemic. All participants were informed of their rights and provided digital consent. Both questionnaires were administered in Vietnamese. Measurement items were adapted from validated scales in previous research, translated, and back translated to ensure cultural relevance (in Vietnamese) *(See Table 1* and *Appendix A)*. Reliability and validity of the scales were confirmed through Cronbach's Alpha, Composite Reliability, and Average Variance Extracted.

Table 1. *The scale of research concepts in the model*

Variables	Code	No. item	Author's Scale	Variables	Code	No. item	Author's Scale
Telepresence	TL	6	[24]	Playfulness	PL	5	[25]
Usefulness	UF	6	[26]	Purchase Intention	PI	4	[22]
Quality Perception	QP	4	[27]				

Sample size was determined using Green's [28] rule ($N \geq 50 + 8m$). With four predictors, the minimum requirement was 82. A total of 360 questionnaires were distributed, and 312 valid responses were retained, exceeding the minimum threshold. Although convenience sampling was used, representativeness was enhanced by diversifying participants across regions, age, gender, income, and professions.

3. Results and Discussion

The data were analyzed using PLS-SEM in SmartPLS, which is well-suited for testing causal relationships in the Vietnamese real estate market. After screening, 312 valid responses were retained. The analysis employed the PLS Algorithm for path coefficients, reliability checks, and bootstrapping to assess model fit.

Table 2. *Demographic information statistics*

	Q1		Q2		Total		Q1		Q2		Total
	Freq.	%	Freq.	%	(%)		Freq.	%	Freq.	%	(%)
Gender						**Occupation**					
Male	87	27.88	79	25.32	53.20	Student	33	10.58	27	8.65	19.23
Female	70	22.44	76	24.36	46.80	Worker	17	5.45	32	10.26	15.71
Age						Officer	55	17.63	47	15.06	32.69
18-29	27	8.65	30	9.62	18.27	Owner	29	9.29	12	3.85	13.14
30-49	79	25.32	65	20.83	46.15	Freelancer	21	6.73	31	9.94	16.67
50-65	51	16.35	60	19.23	35.58	Others	2	0.64	6	1.92	2.56
65+	0	0.00	0	0.00	0.00						
Education Level						**Monthly income (VND)**					
High School	7	2.24	10	3.21	5.45	10M – 20M	17	5.45	23	7.37	12.82
Vocational School	27	8.65	23	7.37	16.02	20M – 30M	28	8.97	31	9.94	18.91
Bachelor's Degree	93	29.81	73	23.40	53.21	30M – 40M	32	10.26	46	14.74	25.00
Master's Degree	21	6.73	31	9.94	16.67	40M – 50M	66	21.15	37	11.86	33.01
Doctoral Degree	9	2.88	18	5.77	8.65	Over 50M	14	4.49	18	5.77	10.26

Out of the 312 valid responses from the 360 questionnaires distributed, the division between Q1 (n = 157) and Q2 (n = 155) was fairly even. Gender representation leaned slightly towards males at 53.20%, while females constituted 46.80% of the sample. Regarding age, the majority fell within the 30-49 age bracket (46.15%), followed by the 50-65 age bracket (35.58%), and the 18-29 age bracket (18.27%). Educational attainment showed that 53.21% held bachelor's degrees, followed by 16.67% with master's degrees, 16.02% with vocational school certificates, 8.65% with Ph.D. degrees, and 5.45% with high school diplomas. Occupations included officers (32.69%), students (19.23%), freelancers (16.67%), workers (15.71%), business owners (13.14%), and other professions (2.56%). In terms of income, 33.01% earned between 40–50 million VND, 25% between 30–40 million VND, 18.91% between 20–30 million VND, 12.82% between 10–20 million VND, and 10.26% earned over 50 million VND per month *(see Table 2).*

Table 3. *Discriminant validity analysis*

	The Fornell & Larcker criterion						The heterotrait-heteromethod (HTMT) correlations				
	PI	QP	PL	TL	UF		PI	QP	PL	TL	UF
PI	0.890					**PI**					
QP	0.742	0.800				**QP**	0.671				
PL	0.782	0.714	0.871			**PL**	0.801	0.821			
TL	0.757	0.690	0.721	0.861		**TL**	0.829	0.761	0.811		
UF	0.621	0.712	0.687	0.676	0.741	**UF**	0.679	0.848	0.798	0.709	

This study undertakes three pivotal tests: convergent validity, internal consistency reliability, and discriminant validity to thoroughly evaluate and authenticate the measurement model *(see Table 3).* Items with outer loadings below the recommended threshold of 0.7 were removed to improve model quality [29]. Furthermore, the constructs demonstrated satisfactory discriminant validity as assessed through the Fornell-Larcker criterion and HTMT ratios. Notably, certain outer loadings fell short of the requisite 0.7 threshold yet remained statistically significant ($p < 0.001$), prompting the judicious removal of these indicators to enhance composite reliability *(see Table 4).* Specifically, TL3 from Telepresence, UF7 from Usefulness, and PL2 from Playfulness were omitted owing to their impact

on bolstering composite reliability. In terms of Cronbach's alphas and Composite Reliability, all indicators surpass the stipulated 0.7 benchmark *(see Table 4).* Additionally, scrutinizing the Average Variance Extracted reveals that each indicator comfortably exceeds the 0.5 threshold, affirming their satisfactory performance. Moreover, Collinearity Statistics (VIF) indicate values below 10 for all indicators, underscoring compliance with requisite standards.

Table 4. *Results of reliability analysis*

Code	OVs (*)	Outer loading	α (**)	CR (***)	AVE (****)	Code	Ovs (*)	Outer loading	α (**)	CR (***)	AVE (****)
TL	TL1	0.921	0.929	0.930	0.807	PL	PL1	0.933	0.918	0.956	0.878
	TL2	0.919					PL3	0.918			
	TL4	0.874					PL4	0.979			
	TL5	0.855				QP	QP1	0.811	0.837	0.843	0.873
	TL6	0.717					QP2	0.790			
UF	UF1	0.773	0.865	0.823	0.677		QP3	0.828			
	UF2	0.881					QP4	0.873			
	UF3	0.812					QP5	0.757			
	UF4	0.789				PI	PI1	0.866	0.929	0.800	0.763
	UF5	0.771					PI2	0.863			
	UF6	0.714					PI3	0.891			
							PI4	0.815			

Note: (*) Observed Variables (OVs); (**) Cronbach's Alpha (α); (***) Composite Reliability (CR); (****) Average Variance Extracted (AVE)

Table 5. *Explanation Power and Predictive Relevance*

Construct	R^2	R^2 adjusted	Q^2
PI	0.591	0.588	0.435
QP	0.531	0.528	0.491
PL	0.578	0.575	0.349

From Table 5, the endogenous constructs in the model demonstrate noteworthy explanatory and predictive power: purchase intention (R^2 = 0.591, Adj. R^2 = 0.588), quality perception (R^2 = 0.531, Adj. R^2 = 0.528), and playfulness (R^2 = 0.578, Adj. R^2 = 0.575). Surpassing the conventional threshold of 0.1, as per Falk & Miller [30], these R^2 values affirm the model's effectiveness. Chin [31] further corroborates our findings, characterizing such values falling between 0.33 and 0.67 as indicative of moderate predictive prowess, thus lending credence to our model's reliability. Furthermore, the Stone–Geisser's Q^2 values obtained via blindfolding are 0.435 for purchase intention, 0.491 for playfulness, and 0.349 for quality perception. As all Q^2 values are greater than zero, the model exhibits predictive relevance for all endogenous constructs [32]. To evaluate whether the structural relationships differ across the VR and video conditions, a multi-group analysis (MGA) was conducted using SmartPLS. The non-parametric bootstrapping approach was applied to compare path coefficients between the two groups. A p-value below 0.05 was considered statistically significant *(see Table 6).*

Table 6. *Result of the Multi-group Analysis*

	β-VR	β-Video	p-value		β-VR	β-Video	p-value
TL -> PL	0.212**	0.611***	0.001	**UF -> QP**	0.312***	0.699***	0.000
PL -> PI	0.249**	0.520***	0.050	**QP -> PI**	0.278	0.049	0.178

**p-value less than 0.001; ***p-value less than 0.01

The SEM results depicted in Figure 1 and Table 6 reveal significant differences in three key relationships between the VR and video conditions. Specifically, the effect of telepresence on playfulness and the effect of playfulness on purchase intention are both significantly weaker in

the VR condition. Likewise, the relationship between usefulness and quality perception also differs considerably across the two media. Conversely, quality perception does not significantly influence purchase intention in either condition, and no difference is observed between VR and video contexts for this relationship.

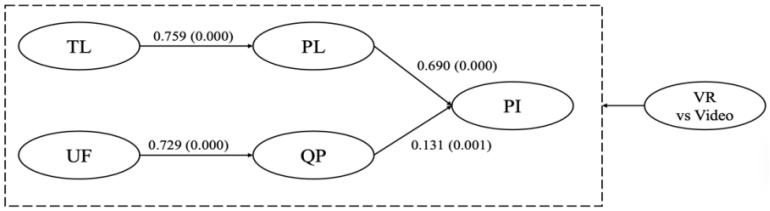

Figure 1. *SEM results*

To test hypothesis 5, a Multi-Group Analysis (MGA) was conducted using SmartPLS with 157 participants in the VR group and 155 in the video group. The MGA confirms significant differences in the constructs of telepresence–playfulness and playfulness purchase intention, providing partial support for H5. In all cases, path coefficients were higher in the video group, suggesting stronger construct relationships under video conditions compared to VR. Moreover, a bootstrapping analysis underscores the differential impact of constructing relationships between the video and VR groups. Notably, path coefficients across all constructs exhibit higher values in the video group compared to the VR group, suggesting a stronger correlation between constructs when consumers engage with video content rather than VR experiences. These findings align with prior studies. Klein [33] and Oum & Han [34] emphasized that telepresence positively influences playfulness, which supports the observed differences across the two media. Similarly, the significant variation in playfulness influencing purchase intention reflects Mathwick et al.'s [35] assertion that experiential enjoyment drives purchase decisions. However, the non-significant difference in the quality perception–purchase intention path contrasts with Tussyadiah et al. [36] who found a consistent effect of quality across media. Overall, the results highlight the differential impact of technological media on consumer perception and behavior, particularly in high-involvement contexts such as residential real estate.

4. Conclusion

4.1. Implications

Although the application of Virtual Reality in real estate has received attention in global research, its integration into the Vietnamese context remains underexplored. This study addresses this gap by examining how telepresence, playfulness, usefulness, and quality perception influence consumer responses in VR-based home-buying experiences.

Findings indicate that Vietnamese consumers remain cautious toward VR, showing a preference for traditional methods despite its immersive potential. The absence of strong impacts from telepresence, playfulness, and usefulness in the VR condition suggests limitations in content quality and user experience. These insights highlight not only theoretical relevance for understanding digital adoption behavior in emerging markets but also offer managerial implications.

Real estate agents and developers should focus on improving VR usability and visual quality to enhance user immersion and perceived value. Gradual familiarization strategies such as offering side-by-side VR and video options, may reduce consumer hesitation. Moreover, the study's insights may be valuable to other industries aiming to integrate immersive technologies into marketing or service delivery in Vietnam.

4.2. Limitations and future research

This study relied on convenience sampling within a predominantly Vietnamese population, which may affect the generalizability of the findings. In addition, variations in VR system quality

and user diversity present constraints in interpreting the results. Future research should expand sampling to include more diverse demographic and regional profiles and explore various real estate property types. It is also recommended to test improved VR content to better capture its potential impact. Longitudinal studies or mixed-method designs could further validate the mediating mechanisms and inform strategies to boost VR adoption in the housing sector.

Acknowledgement

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Appendix A. *Measurement Scales (translated into English)*

Construct	Measurement Items	Ref.
Telepresence (TL)	TL1: I felt like I was really present in the virtual environment. TL2: The VR experience gave me the impression of being at the real location. TL3: I could easily imagine the apartment as if I was visiting it physically. TL4: I felt fully absorbed in the virtual environment. TL5: I had the sensation of "being there." TL6: I interacted with the VR content as if it were a real environment.	[24]
Usefulness (UF)	UF1: VR helped me better understand the apartment. UF2: VR supported me in making house purchase decisions more quickly. UF3: I found VR useful for comparing different apartments. UF4: VR saved me time in the search process. UF5: VR enabled me to make more informed decisions. UF6: I believe VR improved the effectiveness of my home-buying process.	[26]
Quality Perception (QP)	QP1: The images in VR were clear and realistic. QP2: The sound/effects in VR were vivid. QP3: The technical quality of VR met my expectations. QP4: Overall, I was satisfied with the VR quality.	[27]
Playfulness (PL)	PL1: I felt interested while experiencing VR. PL2: I found exploring houses through VR enjoyable. PL3: I felt relaxed and comfortable when using VR. PL4: The experience felt like an entertaining game. PL5: I was motivated to continue exploring more properties via VR	[25]
Purchase Intention (PI)	PI1: I am willing to consider buying the apartment after experiencing VR/video. PI2: I intend to search for more information about the property to move toward purchase. PI3: I am likely to choose this real estate project. PI4: I would recommend this project to others.	[22]