Research on the Influence Mechanism of E-commerce Virtual Hosts on Consumers' Purchase Intention--Based on perceived value theory

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Abstract. With the advancement of AI technology, virtual anchors have emerged as a new form of e-commerce live broadcasting. This study, based on perceived value theory, investigates the factors influencing consumers' purchase intent in virtual anchor live broadcasts. Through a questionnaire survey with 307 responses and SPSS analysis, it was found that consumers' attitudes toward virtual anchors positively impact purchase intent directly or through perceived benefits. The influence of virtual anchors' language proficiency on purchase intent is fully mediated by perceived benefits. Moreover, the alignment of virtual anchors with product types and their professional competence moderate this process.

Keywords: E-commerce live streaming; Virtual anchor; Purchase intention; Perceived benefit.

1. Introduction

With the continuous progress of the intelligent industry, virtual people, a media product driven by artificial intelligence technology, are booming. As per AiMedia Consulting's "China Virtual Human Industry Development and Business Trend Research Report 2023," China's virtual digital human industry hit 186.61 billion yuan and 12.08 billion yuan for the industrial market size and core market size in 2022, signaling significant growth.[1] Among them, the development of virtual anchors is particularly remarkable.Nowadays, the mode of virtual anchor presents diversified characteristics, either as an entertainer using virtual character images to carry out live broadcasts and other entertainment activities, dubbed by a real person and appearing as a virtual character;[2] or as an interactive image fully supported by computer technology, facing the audience in the form of an AI virtual anchor.[3] While these innovative modes enrich content creation and audience experiences, current research predominantly focuses on image dissemination, overlooking their potential and prospects in e-commerce.

Scholars have conducted research in the field of virtual anchors in e-commerce, with qualitative analyses by Li Xiaoxia on the development status and governance challenges of virtual live e-commerce.[4]Secondly, further individual studies quantitatively explore the impact of virtual anchors on consumer experience, partially relevant to this paper's research. For example, Sakuma et al. found that virtual anchor promotions could increase consumers' willingness to buy, and were less persuasive than human marketers overall, but more persuasive for some products.[5]Cuicui Wang et al. expanded existing research to investigate the impact of virtual anchors on purchase intent. Their findings indicated that virtual anchors' interactivity influences consumers' purchase intention, mediated by social presence and moderated by product type, using surveys and eye-tracking experiments.[6]

However, the preliminary studies mentioned above have notable limitations. Firstly, while some research has looked into how virtual anchor interactivity impacts consumer purchasing behavior,[6] they have not delved into consumers' subjective attitudes toward virtual anchors or compared virtual anchors based on technological capabilities.Secondly, although previous studies have identified varying effects of virtual anchors on consumer behavior across different product types,[5]the precise relationship between virtual anchors and product types remains unclear and requires further exploration. This paper addresses the shortcomings in current research by examining the relationship between virtual anchors and product types. It considers the technical aspects of virtual hosts,

consumer attitudes, and perceptions to explore their combined impact on consumer purchase intentions. The study aims to bridge research gaps, broaden virtual anchor research scenarios, offer targeted recommendations for e-commerce applications, and enhance the development of virtual anchors in e-commerce.

2. Research models and assumptions

The research model (Figure 1) suggests that the virtual anchor e-commerce live broadcast mode influences consumers' purchase intention through perceived benefits based on the perceived value theory. The alignment between the virtual anchor image and the product also impacts perceived benefits, while consumer attitude towards the virtual anchor is crucial in the shopping process. Additionally, drawing from the theory of diffusion of innovation, language proficiency of the virtual anchor is used as an index of technological innovation, exploring its impact on purchase intention and the moderating effect of the receiver's professional ability.
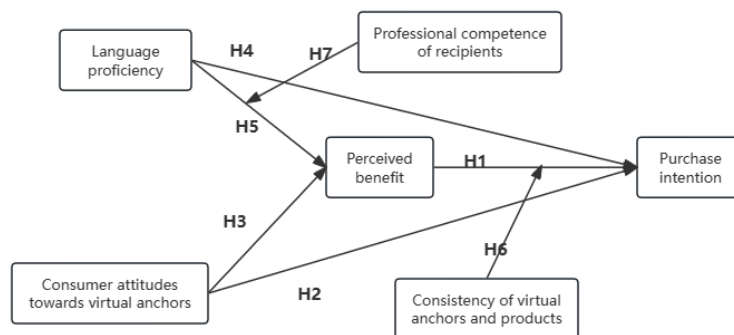

Figure 1 Research model

2.1 Perceived benefits and purchase intention

Perceived benefit is crucial for influencing consumers' purchase willingness, with Ueland et al. highlighting its significant impact on consumer decisions.[7]   Zhao Dongmei and colleagues discovered in their study that consumers' online purchase decisions are directly influenced by perceived benefits.[8] Multiple studies have shown that in e-commerce, perceived benefits positively impact consumer purchase intentions.[9,10]. Accordingly, this paper proposes hypothesis H1:

H1: Perceived benefits positively influence consumers' purchase intention

2.2 The Impact of consumer attitudes towards virtual anchors

Consumer attitudes reflect evaluations of shopping scenarios and methods, impacting purchase intentions significantly. According to Ajzen, purchase intentions are influenced by consumer attitudes, especially when aligned with expectations.[11] On this basis,   According to Ajzen, purchase intentions are influenced by consumer attitudes, especially when aligned with expectations.[12] According to Ajzen, purchase intentions are influenced by consumer attitudes, especially when aligned with expectations.[13] Therefore, this paper proposes hypotheses H2 and H3:

H2: Positive consumer attitudes towards virtual anchors have a positive effect on purchase intention

H3: Positive consumer attitudes towards virtual anchors have a positive impact on perceived benefits

2.3 Impact of language proficiency

Evaluating the technical proficiency of virtual anchors is complex due to the diverse formats, making direct comparisons challenging. For instance, comparing cartoon-style avatars and humanoid style avatars may not be straightforward. Language proficiency, a noticeable and crucial ability for virtual anchors, impacts consumer immersion and emotional connection during interactions, thereby

enhancing the shopping experience and perceived value. This immersive experience can intensify purchase motivation.Therefore, this paper proposes hypotheses H4 and H5:

H4:Language proficiency have a positive effect on purchase intention

H5: Language proficiency have a positive effect on perceived benefits

2.4 The moderating role of Consistency of virtual anchors and products

The consistency theory originated from the study of Friedman et al.,[14]demonstrating the impact of consistency between endorser and endorsed product on advertising effectiveness.In this regard, Misra et al. found that a high degree of consistency between the endorser and the brand enhances consumers' recall of the product and the degree of emotional transfer from the endorser to the product.[15] Based on this, Choi et al. delved deeper and found that when a celebrity's traits are highly compatible with a consumer's ideal self, it significantly enhances the consumer's willingness to buy the product.[16] Similar to studies on consistency in traditional endorsements, this paper defines the consistency between virtual anchors and product types as the degree of match. Meng Lu et al. confirmed that alignment between the webcaster's qualities and presented content enhances audience identification, demonstrating deeper product understanding, increasing professionalism and attractiveness, subsequently boosting purchase willingness in online live shopping scenarios.[17]This study analogizes the impact of live webcasters and content consistency on purchase intention. Variations in virtual anchors' voice and technical effects, combined with different product types, influence users' perceptions of professionalism and attractiveness in live broadcasts, leading to diverse matching effects. These effects regulate consumer perceived benefits, stimulating varying levels of willingness to buy.Therefore, this paper proposes hypothesis H6:

H6: Consistency of virtual anchors and products strengthens the relationship between consumers' perceived benefits and purchase intention

2.5 The moderating role of professional competence of recipients

Professional competence of recipients refers to the consumer's knowledge of the content of the live broadcast, the thickness of knowledge reserves, and the ability to accept and understand the information. Du Xuemei et al. empirically demonstrated the moderating effect of professional competence of recipients in the purchasing behaviour of Internet consumers.[18]According to Chauhuri's study, the more knowledge consumers have about a product, the higher the perceived benefits will be.[19]When the professional competence of recipients is stronger, consumers will pay more attention to the live broadcasting experience, experience and understand the technical ability of the virtual host, participate in the live broadcasting scene, and obtain perceived benefits. Analogous to previous literature, this study argues that the higher the consumers' knowledge about the product, the more they will pay attention to and experience the virtual anchor's proficiency of language, resulting in stronger perceived benefits. Therefore, this paper proposes hypothesis H7:

H7: Professional competence of recipients reinforces the role between language proficiency and perceived benefits

3. Research design

3.1 Questionnaire design

To ensure the questionnaire's good reliability and validity, the scale items in this paper refer to mature scales at home and abroad and are modified according to the specific scenarios of the study, measured using a five-point Likert scale. Consumer attitudes towards virtual anchors are obtained with reference to Hamstra A M[20]on consumers' attitudes towards technology and Zhang Hanpeng et al.[12]on media websites with modifications, with four question items;language proficiency is newly constructed, with four items; and perceived benefits are based   on the Hanpeng Zhang et al.[12] on the perceived benefits of sellers, with three items; consistency of virtual anchors and products was referred to Misra et al.[15] Misra et al.[15]regarding the consistency scale with four

items; professional competence of recipients is referred to the questionnaire proposed by Bansal et al.[22]with three items; the purchase intention is based on the scale used by Liu Jia et al.[23]with three items.

3.2 Data collection and sample description

Questionnaires were distributed via SoJump and Credamo platforms, with 307 recovered and 305 valid (99.35% effective rate) after excluding irregular responses. Results indicate 62.95% female and 37.05% male participants, mostly aged 18-35 (72.13%) with undergraduate education or higher (73.77%). The main occupations are full-time students or private employees (76.39%), with over 91.8% having a monthly disposable income exceeding 1,000 yuan. Additionally, 93.77% of respondents have over 3 years of internet experience, reflecting a high-quality sample aligned with virtual anchoring characteristics.

4. data analysis

4.1 Reliability and validity tests

In this study, the test results are analyzed for reliability using SPSS 26.0 and AMOS 26.0. The Cronbach's alpha for each dimension of the questionnaire is greater than 0.8, indicating good reliability. The KMO value of the questionnaire is greater than 0.8, and the significance probability of the Bartlett's spherical test is P<0.05, indicating that the correlation between the variables is stronger, making it appropriate to carry out factor analysis.

Validity test verifies questionnaire validity, including convergent validity and discriminant validity. The study used AMOS 26.0 for factor analysis, ensuring CR > 0.8 and AVE > 0.5 for each factor, indicating good stability and convergent validity of survey data.

Discriminant validity is assessed by comparing the square root of each latent variable's AVE with the correlation coefficient between variables. In Table 1, the diagonal represents the square root of each latent variable's AVE, while the off-diagonal elements represent the correlation coefficients. The square root of each latent variable's AVE exceeds the correlation coefficient, indicating good discriminant validity in the sample.

Table 1 Distinctiveness validity test of variables

variant	LP	ATT	PB	CON	RE	PI
LP	0.804					
ATT	0.542	0.719				
PB	0.507	0.670	0.753			
CON	0.437	0.461	0.489	0.734		
RE	0.430	0.600	0.621	0.537	0.773	
PI	0.472	0.638	0.675	0.471	0.686	0.740

The above tests indicate this model is able to represent the structure of the measurement factors with good discriminant and convergent validity among the variables.

4.2 Model checking

AMOS 26.0 software is used to model the structural equations and verify the relationship between its variables. According to the calculation results, for the root mean square of approximation error RMSEA=0.054, goodness-of-fit index GFI=0.939, adjusted goodness-of-fit index AGFI=0.910, comparative fit index CFI=0.987, non-normal fit index TLI=0.971, canonical fit index NFI=0.954, etc., the model of the indicators are up to the standard, with a good fit, verifying the reasonableness of the model constructed in this paper.

4.3 Parameter estimation and hypothesis testing

Table 2 Path test results

hypothesis	trails	path factor	S.E.	C.R.	P	result
H1	PB->PI	0.463	0.087	5.296	***	valid
H2	ATT->PI	0.353	0.088	4.025	***	valid
H3	ATT->PB	0.647	0.069	9.374	***	valid
H4	LP->PI	0.062	0.072	0.861	0.389	unvalid
H5	LP->PB	0.199	0.073	2.735	0.006	valid

Based on the standardized path coefficients in Table 2, consumer attitude towards the virtual anchor (β =0.647, p<0.001) and language proficiency (β =0.199, p<0.05) significantly impact perceived benefit. However, the virtual anchor's language proficiency does not significantly affect consumer willingness to buy (β =0.062, p>0.1). Consumer attitudes towards virtual anchors have a significant impact on purchase intention (β =0.353, p<0.001). Hypotheses H1, H2, H3, and H5 are supported, while H4 is not supported based on the test results.

4.4 Bootstrap Mediated Effects Test

Applying Bootstrap to assess the mediating effect, the focus is on perceived benefits mediating between language proficiency and consumer attitude toward virtual anchors and purchase intention. The mediating effects of language proficiency and consumer attitude on purchase intention through perceived gain are 0.092 and 0.299, respectively. The 95% confidence intervals of Bias-corrected and Percentile exclude 0, indicating the significance of both paths' mediating effects.

4.5 Moderating effects test

Moderated effects tests are conducted, and the results of the analyses show (e.g., Table 3): the interaction term of language proficiency and professional competence of recipients has a significant effect on perceived benefits (β=0.117, p<0.001); and the interaction term of perceived benefits and consistency of virtual anchors and products has a significant effect on purchase intention(β=0.119, p<0.001); therefore Hypotheses H6 and H7 are valid.

Through data analysis, we found that stronger professional competence of recipients enhances the impact of virtual anchors' language proficiency on consumers' perceived benefits. This is due to consumers' heightened attention to product knowledge and the virtual anchor's ability to enhance consumer experience. Additionally, strong consistency between the virtual anchor and products further amplifies perceived benefits, ultimately boosting purchase intention by evoking consumers' emotions and stimulating their desire to buy.

Table 3 Hierarchical regression analysis of moderating effects

variant	Perceived benefit		Purchase intention	
	Model 1	Model II	Model III	Model IV
Gender	0.106	0.176*	-0.113	-0.130
Age	-0.008	0.012	0.163	0.136
Educational attainment	0.033	0.023	-0.035	-0.013
Careers	0.112	0.168**	0.206**	0.168**
Monthly disposable income	0.025	-0.012	-0.056	-0.107
Net age	-0.045	-0.063	-0.244***	-0.165**

Professional competence of recipients	0.578***			
Language proficiency X professional competence of recipients		0.117***		
Consistency of the virtual anchor and products			0.522***	
Perceived benefits X Consistency of the virtual anchor and products				0.119***
R^2	0.401	0.491	0.305	0.499
Adj-R^2	0.386	0.479	0.289	0.487
F-value	28.358	40.855	18.650	42.209

4.6 Analysis of results

Consumer attitudes towards virtual anchors can directly impact purchase intention or indirectly through perceived benefits. Strong positive attitudes towards virtual anchors may lead to direct spending in the virtual anchor's live room, or increased purchasing tendency due to elevated perceived benefits during shopping.

The virtual anchor's language proficiency affects perceived benefits and purchase intention. Strong language skills like clear speech enhance these aspects. However, due to subjective evaluations and varying consumer focus on language abilities, its impact on benefits is less than consumer attitudes. Language proficiency measures the virtual anchor's skill level but may not directly impact purchase intention, resulting in hypothesis H4 failing the test.

Professional competence of recipients enhances the link between language proficiency and perceived benefits. Better competence heightens product understanding and attention, increasing immersion in the virtual anchor's language skills for stronger perceived benefits.

Consistency between the virtual anchor and products boosts perceived benefits' influence on purchase intent. A well-suited anchor prompts positive judgments, enhancing broadcast appeal and reinforcing purchase intention.

5. Summary and discussion of the study

5.1 Management implications

Managers using virtual anchor live shopping should conduct market research to understand target users' attitudes. Positive attitudes drive consumer behavior, making the mode more appropriate. Consider consumers' cognitive levels to effectively promote products to a familiar group, as new products may not spur purchase desire.

Improved language expression by virtual anchors enhances consumer purchase motivation. Teams should prioritize technological investment to strengthen virtual anchors' language capabilities.

Managers can assess purchase intent via perceived benefits, mediating language proficiency, consumer attitudes, and purchase intention. The virtual anchor team can gather live broadcast feedbacks and surveys to analyze purchase intentions, adapting strategies as needed.

When selecting a virtual anchor, the brand team must prioritize aligning the anchor's image with the product type. Feedback collection from loyal fans can help assess this alignment before expanding live sales to a wider audience.

5.2 Future research directions

This study has limitations. Firstly, it focuses solely on the virtual anchor's language proficiency as the technical variable, neglecting other aspects like visual animation effects. Future research should consider the overall technical development of virtual anchors. Secondly, it does not account for internal differences in perceived benefits. Future studies can explore segmentation dimensions, such as emotional and economic benefits. Thirdly, the research is confined to virtual anchors promoting products, and future studies can expand to assess the marketing effects of virtual anchors on the purchasing power of different brands.

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