

A COMPREHENSIVE RESEARCH ON THE INFLUENCE OF LIVE STREAMING SALES OF FRESH AGRICULTURAL PRODUCTS ON CONSUMERS' PURCHASE INTENTIONS

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Abstract:

In response to the rapid growth of live-streaming e-commerce and its transformative impact on agricultural product marketing, this study investigates how live-streaming sales of fresh agricultural products influence consumers' purchase intentions through the mediating role of perceived value. Targeting Chinese consumers who have purchased fresh agricultural products via live streaming within the past six months, a structured questionnaire survey was conducted, yielding 415 valid responses. The study employed SPSS 26.0 and AMOS 24.0 for data analysis, utilizing Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Structural Equation Modeling (SEM) to rigorously test the proposed theoretical framework. The results reveal that four key attributes of the live-streaming scenario—anchor charm, professionalism, interactivity, and spatial presence—significantly enhance consumers' purchase intentions both directly and indirectly through perceived value. Among these factors, professionalism and spatial presence exert the strongest influence on perceived value, highlighting the pivotal role of credibility and immersive experience in consumer decision-making. Additionally, perceived value is confirmed as a partial mediator that translates experiential stimuli into behavioral intentions. Subgroup analyses indicate that age, education level, occupation, and income significantly moderate consumers' perceptions and responses to live-streaming attributes, whereas gender shows no significant differences. This study contributes to the literature by extending the Stimulus–Organism–Response (S-O-R) framework to the domain of fresh agricultural product live-streaming, offering a nuanced understanding of how cognitive value assessments mediate consumer behavior in digital commerce environments. Practically, the findings provide actionable insights for producers, platform operators, and policymakers to develop professionalism-driven, immersive, and trust-enhancing live-streaming strategies. Future research is encouraged to explore longitudinal behavioral dynamics and cross-cultural variations in live-streaming consumption patterns.

Keywords: live-streaming e-commerce, fresh agricultural products, perceived value, purchase intention, stimulus–organism–response (s-o-r) model

1. INTRODUCTION

Over the past decade, live-streaming e-commerce has rapidly evolved into one of the most transformative forces in the digital economy, particularly in China where the fusion of digital technology and consumer culture has reached unprecedented levels (Li et al., 2025; Qin et al., 2024). As a new form of interactive commerce, live-streaming integrates product display, real-time interaction, and sales conversion into one seamless experience (Wang, 2021; Wang et al., 2022). This development has been strongly supported by national policies such as the “Digital Agriculture and Rural Development Plan (2019–2025)” issued by the Ministry of Agriculture and Rural Affairs, which encourages the deep integration of internet technologies with rural industries (Yan & Cao, 2024). In addition, the “Opinions on Promoting High-quality Development of Rural E-commerce” released by the State Council in 2021 emphasized the role of live-streaming in rural revitalization, positioning it as a key channel for agricultural product marketing and employment promotion (Yao, 2022).

Against this policy backdrop, the scale of live-streaming commerce in China has expanded rapidly. According to the China Internet Network Information Center (CNNIC, 2024), the number of online shoppers in China reached 974 million in 2024, more than tripling since 2013 (Wang & Hu, 2024). Data from iiMedia Research (2024) shows that the transaction volume of China’s live-streaming e-commerce reached ¥5.33 trillion, with the number of users exceeding 700 million. Within this ecosystem, fresh agricultural products have become a fast-growing category. The online penetration rate of fresh produce reached 27.6% in 2023, up from just 7.4% in 2018 (Li et al., 2022; Si, 2021). Major platforms such as Taobao Live, JD Live, and Pinduoduo have launched dedicated agricultural zones, while local governments have also introduced subsidy schemes to support farmers and cooperatives in live-streaming infrastructure, training, and traffic allocation (Cao, 2024; Zhu et al., 2024).

However, despite these favorable developments, the reality of live-streaming sales of fresh agricultural products is riddled with structural and operational constraints. First, the digital divide remains a critical bottleneck—rural areas still lag in broadband coverage, and many farmers lack the digital literacy to host effective streams (Zheng et al., 2025). Second, the live-streaming industry has shown signs of Matthew Effects, where a small number of internet celebrities dominate traffic and conversion, while grassroots anchors struggle to gain visibility (Yu, 2024). Third, consumer trust in fresh agricultural products remains fragile due to concerns over food safety, misleading promotions, and delivery reliability (Wu et al., 2021). Reports by the China Consumers Association (2023) note a significant rise in complaints about misrepresented agricultural goods in live-streaming contexts. These challenges highlight a paradox: while live-streaming lowers market barriers, it also amplifies the risks of inequality, misinformation, and platform dependence (Cunningham et al., 2019; Xiao, 2024).

From a theoretical standpoint, existing studies have inadequately addressed the unique psychological and behavioral mechanisms at play in the live-streaming context. Much of the current literature either focuses on general e-commerce or analyzes fresh produce marketing in offline or static digital environments. The Stimulus-Organism-Response (S-O-R) theory provides a foundational lens to examine how external stimuli in live-streaming (e.g., anchor performance, interactivity, spatial immersion) influence consumers’ internal psychological states and behavioral intentions (Jacoby, 2002). At the same time, Perceived Value Theory enriches this model by introducing dimensions such as functional, emotional,

and social value, which play crucial roles in consumers' trust formation and decision-making processes (Sánchez-Fernández & Iniesta-Bonillo, 2007; Sweeney & Soutar, 2001; Zeithaml, 1988). This study aims to bridge these perspectives to explain how live-streaming characteristics translate into purchase intention through perceived value mediation.

Accordingly, the main objectives of this research are:

- 1) To clearly define the concept, origin, and development background of live-streaming sales of fresh agricultural products, and comprehensively review its current research status, including aspects such as the role of anchors and the popularization of professional knowledge.
- 2) To systematically identify and analyze the influencing factors of consumers' purchase intention for fresh agricultural products, and accurately describe the characteristics of such intention, considering factors like consumer trust, product quality concerns, and digital behavior patterns.
- 3) To deeply explore the impact mechanism of live-streaming sales on consumers' purchase intention, clarify the causal relationships among key variables such as anchor characteristics, perceived value, and behavioral outcomes, and empirically verify the mediating and moderating effects.
- 4) To critically evaluate the limitations of current literature and propose an integrated theoretical framework that enhances both academic understanding and practical guidance in the domain of agricultural live-streaming commerce.

In summary, this study is grounded in both urgent practical needs and theoretical advancement goals. It seeks to provide empirical evidence and strategic insights for agricultural practitioners, platform operators, and policymakers aiming to optimize live-streaming commerce for inclusive rural development. The remainder of this paper is organized as follows: Section 2 presents a comprehensive review of relevant literature and theoretical models; Section 3 outlines the research design, methodology, and data collection procedures; Section 4 reports the empirical findings from structural equation modeling; Section 5 discusses the theoretical and managerial implications, and concludes with recommendations for future research.

2. LITERATURE REVIEW

This study adopts an integrated framework combining the Stimulus–Organism–Response (S-O-R) model (Jacoby, 2002) and Perceived Value Theory (Zeithaml, 1988; Sweeney & Soutar, 2001). The S-O-R model explains consumer behavior as a sequence in which external stimuli (S) influence internal cognitive–affective states (O), which in turn drive behavioral responses (R). Perceived Value Theory defines these internal states as consumers' trade-offs between perceived benefits and costs, encompassing functional, emotional, and social value dimensions (Zeithaml, 1988; Sweeney & Soutar, 2001). Within this framework, the live-streaming of fresh agricultural products is conceptualized as a set of experiential stimuli influencing purchase intention via perceived value as the core organismic variable. Four key stimulus dimensions are identified: anchor charm—the host's attractiveness, credibility, and emotional appeal, which enhance trust and engagement (Lv et al., 2022); anchor professionalism—expertise and communication clarity that reduce uncertainty (Linh & Park, 2025); interactivity—real-time reciprocal engagement through comments, Q&A, and demonstrations that strengthen perceived responsiveness (Anderson et al., 2025; Shih et al., 2024); and spatial presence—the immersive feeling of “being there,” which fosters emotional connection and decision involvement (Wienrich et al., 2021; Peng et al., 2024; Shi et al., 2023). While these factors have been validated in digital marketing, their

combined influence remains underexplored in the live-streaming of perishable, trust-sensitive goods, where authenticity and freshness are critical.

Informed by the Stimulus–Organism–Response (S-O-R) model (Jacoby, 2002), this study conceptualizes the live-streaming environment as a structured set of external stimuli capable of influencing consumer behavior. Among these stimuli, four elements have demonstrated theoretical relevance in shaping user experience and purchase intention: anchor charm, anchor professionalism, interactivity, and spatial presence. Anchor charm refers to the host's perceived attractiveness, credibility, and emotional appeal, which prior research has linked to heightened viewer trust and engagement (Lv et al., 2022). Anchor professionalism captures the anchor's expertise and communication clarity, contributing to reduced uncertainty and perceived risk (Linh & Park, 2025). Interactivity encompasses real-time audience engagement mechanisms such as Q&A, comment interaction, and product demonstrations, which foster a participatory atmosphere (Shih et al., 2024). Finally, spatial presence describes the consumer's immersive perception of being present in the live-streamed environment, enhancing emotional connection and decision involvement (Peng et al., 2024; Shi et al., 2023). Although these stimulus dimensions have been validated in various digital marketing contexts, their roles in live-streaming of fresh agricultural products—a category involving higher product risk and authenticity concerns—remain underexplored. Thus, the following hypotheses are proposed:

H1: The live-streaming e-commerce scenario of fresh agricultural products has a significant positive impact on consumers' purchase intention.

H1a: The charm of anchors in live-streaming of fresh agricultural products has a significant positive impact on consumers' purchase intention.

H1b: The professionalism of anchors in live-streaming of fresh agricultural products has a significant positive impact on consumers' purchase intention.

H1c: The interactivity of anchors in live-streaming of fresh agricultural products has a significant positive impact on consumers' purchase intention.

H1d: The spatial presence in live-streaming of fresh agricultural products has a significant positive impact on consumers' purchase intention.

Perceived value, originally defined by Zeithaml (1988) as the consumer's overall assessment of a product's utility based on what is received and what is given, has become a central construct in explaining consumer decision-making. Sweeney and Soutar (2001) further extended this concept by identifying its multidimensional nature, encompassing functional, emotional, and social value. In digitally mediated contexts such as live-streaming commerce, perceived value reflects not only product-related evaluations but also experiential judgments shaped by environmental stimuli. When consumers watch live-streams featuring fresh agricultural products, their perceptions of value may be influenced by various features of the stream itself (Ju et al., 2025). For instance, anchor charm can generate emotional resonance and trust, enhancing emotional value; anchor professionalism improves functional understanding of product quality and authenticity; interactivity strengthens perceived responsiveness, fostering social value; and spatial presence deepens immersion, making the experience more vivid and persuasive. While previous studies have applied perceived value theory to fashion and general retail (Kumar Singh et al., 2022; Laukkanen & Tura, 2022), little research has examined how these specific live-streaming stimuli affect perceived value in the context of agricultural products, where product perishability and trust deficits are prominent concerns. Therefore, this study proposes the following hypotheses:

H2: The live-streaming e-commerce scenario of fresh agricultural products has a significant positive impact on consumers' perceived value.

H2a: The charm of anchors in fresh agricultural product live-streaming has a significant positive impact on consumers' perceived value.

H2b: The professionalism of anchors in fresh agricultural product live-streaming has a significant positive impact on consumers' perceived value.

H2c: The interactivity of anchors in fresh agricultural product live-streaming has a significant positive impact on consumers' perceived value.

H2d: The spatial presence in fresh agricultural product live-streaming has a significant positive impact on consumers' perceived value.

The relationship between perceived value and purchase intention has been extensively validated across marketing and consumer behavior literature. Rooted in Zeithaml (1988)'s foundational work, perceived value captures a consumer's trade-off between perceived benefits and perceived sacrifices, serving as a direct cognitive appraisal that precedes behavioral intention. In the context of experiential and digital commerce, Sweeney and Soutar (2001)'s multidimensional value model—encompassing functional, emotional, and social value—has been widely adopted to explain complex consumer choices. Empirical studies have consistently shown that when consumers perceive higher levels of product quality, emotional satisfaction, or social connection, they are more likely to form strong purchase intentions (Cheng & Lin, 2023; Luo et al., 2022; Zhou et al., 2023). Within live-streaming e-commerce, especially involving perishable and trust-sensitive products like fresh agricultural goods, perceived value becomes even more critical. Consumers rely on cues from anchors, interactivity, and immersive features to form holistic judgments about product authenticity, freshness, and purchasing reliability (Wang et al., 2021). Despite increasing attention to live-stream value perception in consumer electronics and apparel markets, its application to fresh food consumption remains underexplored. Given the distinctive characteristics of agricultural products—such as perishability, regionality, and quality ambiguity—this study posits that perceived value derived from the live-streaming experience is a key determinant of consumers' willingness to purchase. Therefore, the following hypothesis is proposed:

H3: The perceived value of consumers for fresh agricultural products has a significant positive impact on their purchase intention.

Within the framework of the Stimulus–Organism–Response (S-O-R) model (Jacoby, 2002) and Perceived Value Theory (Sánchez-Fernández & Iñiesta-Bonillo, 2007; Sweeney & Soutar, 2001; Zeithaml, 1988), perceived value is widely recognized as a mediating cognitive-affective mechanism that translates external stimuli into behavioral responses. In live-streaming e-commerce, stimuli such as anchor attractiveness, professionalism, interactivity, and spatial presence shape viewers' perceptions of value, which in turn influence their willingness to purchase. Numerous studies have demonstrated the mediating role of perceived value in digital consumer contexts. For instance, Trivedi et al. (2022) found that in mobile shopping environments, perceived value mediates the impact of interface design and seller reputation on purchase intention. Similarly, Wu and Huang (2023) showed that perceived value links live-streamers' interactivity with consumer trust and behavior in social commerce. In the context of agricultural e-commerce, where product evaluation relies on limited sensory cues and trust formation is critical, perceived value becomes a crucial explanatory variable. It captures not only product-related judgments (e.g., freshness, quality, authenticity), but also experiential value derived from emotional resonance and social connection (Sun & Yu, 2025). Despite its theoretical relevance, few empirical studies have examined whether perceived value mediates the impact of live-streaming characteristics on consumer intentions in the domain of fresh agricultural products. Therefore, this study proposes the following hypotheses:

H4: Perceived value plays a mediating role in the relationship between the live-streaming e-commerce scenario of fresh agricultural products and consumers' purchase intention.

H4a: Perceived value mediates the relationship between the charm of anchors in fresh agricultural product live-streaming and consumers' purchase intention.

H4b: Perceived value mediates the relationship between the professionalism of anchors in fresh agricultural product live-streaming and consumers' purchase intention.

H4c: Perceived value mediates the relationship between the interactivity of anchors in fresh agricultural product live-streaming and consumers' purchase intention.

H4d: Perceived value mediates the relationship between the spatial presence in fresh agricultural product live-streaming and consumers' purchase intention.

To visually synthesize the proposed hypotheses and clarify the underlying theoretical logic, this study constructs an integrated conceptual model grounded in the S-O-R framework and Perceived Value Theory. As shown in Figure 1, the model illustrates how four key dimensions of the live-streaming scenario—anchor charm, professionalism, interactivity, and spatial presence—jointly influence consumers' perceived value and purchase intention, with perceived value serving as a mediating mechanism.

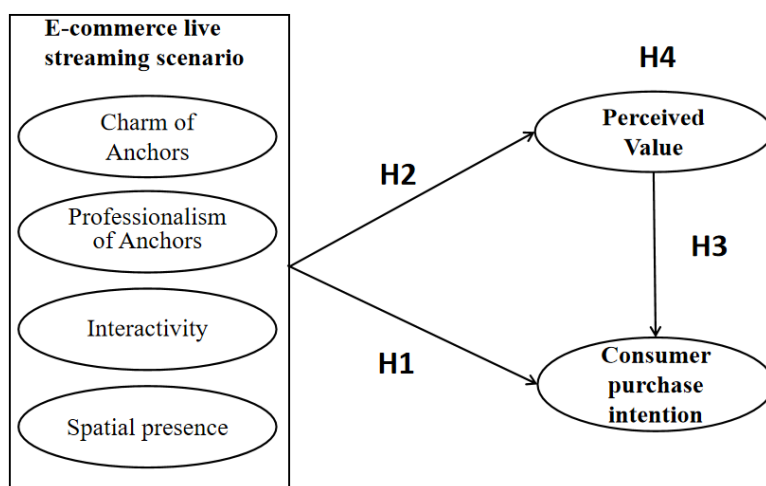


Figure 1. Theoretical Framework

3.METHODOLOGY

3.1 Research Subjects and Sampling Procedure

The target population for this study comprises consumers in China who have engaged in live-streaming purchases of fresh agricultural products within the past six months. This population was chosen due to its direct experiential relevance, which ensures the validity of their perceptual and behavioral responses. A purposive sampling strategy was adopted, wherein respondents were recruited through popular digital channels such as WeChat groups, Weibo threads, and agriculture-focused e-commerce forums. Data collection was conducted over a three-week period in June 2025. A total of 478 responses were obtained, of which 415 were retained after removing incomplete or logically inconsistent entries, resulting in a valid response rate of 91.6%. This sampling strategy ensured that participants had adequate familiarity with the specific e-commerce scenario under examination.

3.2 Questionnaire Design and Measurement Scales

The research instrument was a structured questionnaire comprising three sections. The first section served to screen participants and collect demographic data, including age, gender, education level, monthly income, and the frequency of live-stream shopping behavior. This section ensured the contextual eligibility of respondents and provided variables for descriptive profiling.

The second section focused on the measurement of the study's theoretical constructs using 7-point Likert-type scales (1 = strongly disagree; 7 = strongly agree). Each construct was measured using multiple items adapted from validated instruments in prior studies. Anchor attractiveness (4 items) was drawn from Park and Lin (2020), capturing charm, credibility, and charisma. Anchor professionalism (4 items) was based on Liu et al. (2023), measuring product knowledge and communication clarity. Interactivity (4 items), adapted from McMillan and Hwang (2002), referred to real-time exchange, such as Q&A and message responsiveness. Spatial presence (4 items), modified from Park and Sundar (2015), assessed the degree of immersive perception in the live-stream environment. Perceived value (6 items), based on Sweeney and Soutar (2001), covered functional (e.g., product quality), emotional (e.g., enjoyment), and social (e.g., identity and belonging) dimensions. Purchase intention (3 items), adapted from Kim et al. (2020), measured the consumer's willingness to buy the products promoted during the live-stream. The final section included attention-check items and one open-ended question to assess data quality and capture additional feedback.

3.3 Data Analysis Strategy

The analytical procedures were conducted using SPSS 26.0 and AMOS 24.0 to ensure statistical rigor and structural model validity. First, descriptive statistics were computed to profile respondent characteristics and consumption behavior patterns. Second, internal consistency of the constructs was evaluated through Cronbach's alpha and composite reliability (CR), while convergent validity was examined using average variance extracted (AVE). Discriminant validity was confirmed using the Fornell-Larcker criterion and cross-loadings.

Exploratory Factor Analysis (EFA) was initially employed to validate construct dimensionality, followed by Confirmatory Factor Analysis (CFA) to test the measurement model's fit and construct reliability. Structural Equation Modeling (SEM) was then used to test the hypothesized paths among the variables, including direct, indirect, and mediating effects. Lastly, bootstrapping with 5,000 resamples was employed to determine the statistical significance and confidence intervals of the mediating effects, enhancing the robustness of the inferential results.

4. RESULTS

4.1 Descriptive Analysis

Table 1 presents the demographic profile of the 415 valid respondents. Females accounted for 56.87% and males for 43.13%. Age distribution was diverse, with the largest group aged 26–30 (26.51%), followed by those over 41 (29.16%) and 18–25 (25.06%). In terms of education, 33.01% held undergraduate degrees, 32.29% vocational/technical qualifications, 18.07% graduate degrees, and 16.63% senior secondary or below. Most respondents were office workers (71.33%), with freelancers (25.06%) and students (3.61%) making up the rest. Regarding income, 22.65% earned above 70,000 yuan annually, 20.96% earned 60,001–70,000 yuan, and 20.48% earned 50,001–60,000 yuan, indicating a generally moderate-to-high income level. Overall, the sample composition supports the study's analysis of consumer behavior in fresh agricultural product live-streaming.

Table 1. Overview of Demographic Characteristics of the Sample

Variable	Option	Frequency	Percent age	Mean Standard	Deviation
Gender	Male	179	43.133	1.559	0.497
	Female	236	56.867		
	18-25 years old	104	25.060		
	26-30 years old	110	26.506		
	31-35 years old	41	9.879		
	36-40 years old	39	9.397		
	Over 41 years old	121	29.156		
Education	Senior secondary education or below	69	16.626	2.545	0.916
	Vocational and Technical Education	134	32.289		
	Undergraduate education	137	33.012		
	Graduate education	75	18.072		
Occupation	Student	15	3.614	2.174	0.515
	Office worker	296	71.325		
	Freelancer	104	25.060		
	Below 30000yuan	15	36.144		
Annual Resident Income	30001-40000 yuan	63	15.181	3.984	1.543
	40001-50000 yuan	71	17.108		
	50001-60000 yuan	85	20.482		
	60001-70000 yuan	87	20.964		
	Above 70000yuan	94	22.651		

4.2 Reliability and Validity Analysis

Table 2 indicates that all six latent constructs in this study met the recommended reliability threshold of 0.70 (Nunnally & Bernstein, 1994), confirming strong internal consistency. Specifically, anchor charm (4 items) scored 0.872, professionalism (4 items) 0.859, interactivity (4 items) 0.866, and spatial presence (4 items) 0.891. The mediating variable, perceived value (5 items), achieved the highest reliability at 0.896, while purchase intention (3 items) scored 0.874. These high Cronbach's Alpha values demonstrate that the measurement items consistently capture viewers' evaluations of live-streaming attributes, value perceptions, and purchase intentions in the context of fresh agricultural product e-commerce, ensuring the robustness of constructs for subsequent SEM analysis.

Table 2. Reliability Analysis of the Formal Questionnaire

Variable	Item	Cronbach's Alpha
Charm	4	0.872
Professionalism	4	0.859
Interactivity	4	0.866
Spatial Presence	4	0.891
Perceived Value	5	0.896
Purchase Intention	3	0.874

4.3 Model Fit Evaluation

Table 3 shows that all fit indices meet accepted thresholds, confirming an excellent model fit. χ^2/df is 1.607 (<3) and RMSEA is 0.038 (<0.10), indicating close model-data correspondence. Incremental indices—CFI (0.977), IFI (0.977), and NFI (0.942)—all exceed 0.90, while GFI is 0.929 (>0.80), demonstrating robust construct validity and empirical adequacy (Hair et al., 2012). These results validate the CFA model as a solid basis for subsequent SEM analysis.

Table 3. Model Fit Test

Test Index	Fit Standard	Model Fit Index	Fit Effect
χ^2/df	<3	1.607	Ideal
RMSEA	<0.10	0.038	Ideal
CFI	>0.90	0.977	Ideal
NFI	>0.90	0.942	Ideal
GFI	>0.80	0.929	Ideal
IFI	>0.90	0.977	Ideal

4.4 Convergent Validity Test

Table 4 confirms strong convergent validity for all six constructs in the live-streaming purchase intention model. Factor loadings range from 0.735 to 0.907, exceeding the 0.70 benchmark (Fornell & Larcker, 1981), with the highest values observed for Purchase Intention (RLP1 = 0.907) and Spatial Presence (ASP3 = 0.888). AVE values span 0.65 (Professionalism) to 0.737 (Purchase Intention), all above 0.50, indicating that each construct explains over half of the variance in its indicators. Composite reliability (CR) ranges from 0.881 to 0.909, surpassing the 0.70 threshold, with Perceived Value highest at 0.906, reflecting strong internal consistency. These results verify that the measurement model effectively captures consumer perceptions of charm, professionalism, interactivity, spatial presence, and perceived value in shaping purchase intention in a live-streaming context.

Table 4. Convergent Validity Test Table

Variable	Item	Factor Loading λ	S.E.	AVE	CR
Charm	AC1	0.822	-	0.669	0.89
	AC2	0.851	0.053		
	AC3	0.822	0.054		
	AC4	0.774	0.05		
Professionalism	AP1	0.852	-	0.65	0.881
	AP2	0.776	0.045		
	AP3	0.827	0.048		
	AP4	0.768	0.044		
Interactivity	AI1	0.848	-	0.669	0.89
	AI2	0.809	0.051		
	AI3	0.833	0.051		
	AI4	0.779	0.052		
Spatial Presence	ASP1	0.879	-	0.715	0.909
	ASP2	0.795	0.041		
	ASP3	0.888	0.04		
	ASP4	0.815	0.041		
Perceived Value	CPV1	0.735	-	0.659	0.906

	CPV2	0.774	0.07		
	CPV3	0.804	0.072		
	CPV4	0.881	0.075		
	CPV5	0.858	0.074		
	RLP1	0.907	-		
Purchase Intention	RLP2	0.873	0.042	0.737	0.894
	RLP3	0.792	0.039		

4.5 Discriminant Validity Test

Table 5 shows that the square roots of AVE for all constructs—Charm (0.818), Professionalism (0.806), Interactivity (0.818), Spatial Presence (0.845), Perceived Value (0.812), and Purchase Intention (0.859)—are greater than their correlations with other constructs, meeting the Fornell–Larcker criterion (Fornell & Larcker, 1981). For instance, Perceived Value’s AVE square root (0.812) exceeds its highest correlation (0.349 with Professionalism), and Purchase Intention’s (0.859) is higher than its strongest correlation (0.363 with Spatial Presence). This confirms that the six constructs—capturing viewers’ perceptions of live-streaming hosts, interaction quality, immersive experience, perceived value, and purchase intention—are conceptually distinct, supporting the measurement model’s discriminant validity and suitability for subsequent SEM analysis.

Table 5. Discriminant Validity Test Table

	Charm	Professionalism	Interactivity	Spatial Presence	Perceived Value	Purchase Intention
Charm	0.818					
Professionalism	0.267	0.806				
Interactivity	0.232	0.336	0.818			
Spatial Presence	0.252	0.271	0.300	0.845		
Perceived Value	0.280	0.349	0.327	0.324	0.812	
Purchase Intention	0.286	0.306	0.304	0.363	0.311	0.859

Note: The numbers on the diagonal represent the square root of AVE values.

4.6 Test for Common Method Bias

Table 6 indicates no serious common method bias. The first unrotated factor accounts for 31.047% of total variance, below the 40% threshold (Podsakoff et al., 2003), while six factors together explain 77.554% before rotation, confirming a multi-factor structure. After rotation, the first factor’s variance contribution drops to 14.970%, with variance more evenly distributed across factors. These results suggest that responses on constructs such as charm, professionalism, interactivity, spatial presence, perceived value, and purchase intention are not dominated by a single source of variance, reinforcing the reliability of the measurement model and the robustness of findings in the live-streaming commerce context.

Table 6. Harman’s Single-Factor Analysis Results

Fact or Nu	Eigenvalue			Variance Explained Before Rotation			Variance Explained After Rotation		
	Eigenvalue	Variance	Cumulative%	Eigenvalue	Variance	Cumulative%	Eigenvalue	Variance	Cumulative%

mbe	Explain			Explain			Explain		
r	ed%			ed%			ed%		
1	7.451	31.047	31.047	7.451	31.047	31.047	3.593	14.970	14.970
2	2.595	10.811	41.858	2.595	10.811	41.858	3.065	12.771	27.741
3	2.095	8.731	50.589	2.095	8.731	50.589	2.436	10.150	37.891
4	1.903	7.931	58.52	1.903	7.931	58.520	2.417	10.073	47.963
5	1.649	6.869	65.389	1.649	6.869	65.389	2.412	10.048	58.011
6	1.326	5.525	77.554	1.326	5.525	77.554	2.336	9.734	77.554

4.7 Structural Equation Model Results

Figure 2 shows that all four dimensions—Charm ($\beta = 0.64$), Professionalism ($\beta = 0.73$), Interactivity ($\beta = 0.71$), and Spatial Presence ($\beta = 0.69$)—significantly shape the second-order construct Live Streaming. Live Streaming positively affects Perceived Value ($\beta = 0.58$) and Purchase Intention ($\beta = 0.19$), with an additional indirect effect via Perceived Value ($\beta = 0.46$), producing a stronger mediated pathway (0.267) than the direct link. All indicator loadings (0.63–0.86) exceed the 0.60 threshold, confirming measurement reliability. These findings empirically validate the model, underscoring perceived value as a key mechanism translating immersive live-streaming features into purchase behavior.

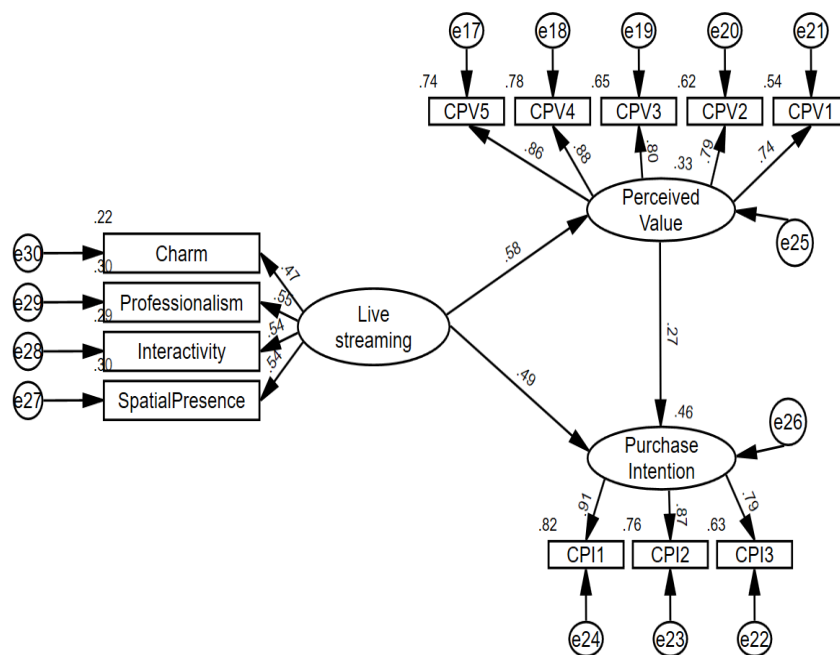


Figure 2. Structural Equation Model Diagram1

Figures 2 and 3 together validate the hypothesized SEM relationships but offer different analytical perspectives. Figure 3 frames live streaming as a second-order construct influencing purchase intention both directly and via perceived value, while Figure 4 decomposes the four attributes into independent predictors. In the latter, charm shows minimal effects ($\beta = 0.15, 0.08$), professionalism has moderate impacts ($\beta = 0.22, 0.26$), and interactivity yields meaningful contributions ($\beta = 0.14, 0.22$). Spatial presence is the strongest driver ($\beta = 0.27, 0.22$). Across both models, perceived value remains a robust mediator ($\beta = 0.41$). The convergence of findings confirms the model's validity and highlights perceived value as the core mechanism linking immersive live streaming features to consumer purchase behavior.

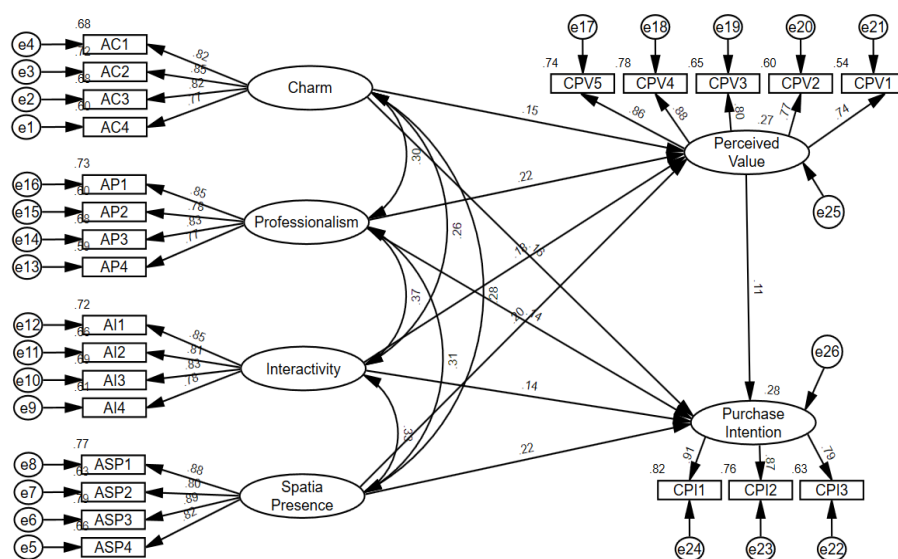


Figure 3. Structural Equation Model Diagram2

Table 8 compares the fit indices of the two structural equation models, showing that both achieve excellent statistical performance across all metrics. For CMIN/DF, Model 1 (1.275) and Model 2 (1.607) fall well within the 1–3 range, indicating minimal deviation between observed and estimated data. RMSEA values—0.026 for Model 1 and 0.038 for Model 2—are both below 0.05, reflecting outstanding model–population fit. Incremental fit measures are similarly strong, with Model 1 (IFI = 0.994, TLI = 0.993, CFI = 0.994) slightly outperforming Model 2 (IFI = 0.977, TLI = 0.973, CFI = 0.977). These results confirm that both the second-order mediation model and the direct-effect model are statistically sound, with the mediation framework offering marginally superior overall fit.

Table 8. Model Fit Test

Index	CMIN/DF	RMSEA	IFI	TLI	CFI
St.	1-3excellent, 3-5good	< 0.05excellent , <0.08good	> 0.9excellent , >0.8good	> 0.9excellent , >0.8good	> 0.9excellent , >0.8good
Result model 1	1.275	0.026	0.994	0.993	0.994
Result model 2	1.607	0.038	0.977	0.973	0.977
Fit Effect	Ideal	Ideal	Ideal	Ideal	Ideal

4.10 Direct Path Test

Table 9 reports the direct path coefficients and critical ratios, confirming that the e-commerce live streaming environment exerts significant positive effects on both perceived value ($\beta = 0.576$, $CR = 6.906$, $p < 0.001$) and purchase intention ($\beta = 0.488$, $CR = 5.229$, $p < 0.001$). These results validate H1 and H2, indicating that live streaming functions both as a direct driver of consumer behavioral intention and as an indirect influencer through perceived value. The mediating role of perceived value (H3: $\beta = 0.265$, $CR = 3.888$, $p < 0.05$) is also supported, suggesting that cognitive and affective evaluations of the live stream’s benefits substantially shape purchase likelihood.

At the attribute level, all four experiential components—charm (H1a: $\beta = 0.160$, $p < 0.01$), professionalism (H1b: $\beta = 0.144$, $p < 0.05$), interactivity (H1c: $\beta = 0.137$, $p < 0.05$), and spatial presence

(H1d: $\beta = 0.223$, $p < 0.001$)—significantly predict purchase intention. Similarly, each dimension also enhances perceived value: charm (H2a: $\beta = 0.148$, $p < 0.01$), professionalism (H2b: $\beta = 0.224$, $p < 0.001$), interactivity (H2c: $\beta = 0.176$, $p < 0.01$), and spatial presence (H2d: $\beta = 0.198$, $p < 0.001$).

These findings provide empirical confirmation of a dual-path mechanism in immersive commerce, where live streaming attributes stimulate purchase behavior directly while also working indirectly through perceived value. This decomposition into core experiential elements advances the theoretical understanding of how specific content and sensory features translate into consumer engagement and conversion in online retail contexts.

Table 9. Direct Path Test

Hypothesis	Path	S.E.	C.R.	Path Coefficient	P	Test Result
H1	E-commerce live streaming scenario→Purchase Intention	0.135	5.229	0.488	***	Accepted
H2	E-commerce live streaming scenario→Perceived Value	0.141	6.906	0.576	***	Accepted
H3	Perceived Value→Purchase Intention	0.058	3.888	0.265	*	Accepted
H1a	Charm of Anchors→Purchase Intention	0.057	2.987	0.16	**	Accepted
H1b	Professionalism of Anchors→Purchase Intention	0.061	2.518	0.144	*	Accepted
H1c	Interactivity→Purchase Intention	0.053	2.443	0.137	*	Accepted
H1d	Perceived Value→Purchase Intention	0.048	4.048	0.223	***	Accepted
H2a	Charm of Anchors→Perceived Value	0.065	2.82	0.148	**	Accepted
H2b	Professionalism of Anchors→Perceived Value	0.069	3.999	0.224	***	Accepted
H2c	Interactivity→Perceived Value	0.061	3.189	0.176	**	Accepted
H2d	Spatial_Presence→Perceived Value	0.054	3.718	0.198	***	Accepted

4.11 Mediation Effect Test

Table 10 presents the mediation effect test results, confirming the role of perceived value as a statistically significant yet partial mediator in the structural model. For the overall live streaming scenario (H4), the total effect on purchase intention is substantial (0.641, 95% CI: 0.527–0.741), with 76.13% attributable to the direct path (0.488) and 23.87% to the indirect path via perceived value (0.153). This pattern indicates that while direct influences dominate, perceived value consistently channels part of the scenario's effect on purchase decisions.

At the dimensional level, all four core scenario features display significant partial mediation effects through perceived value. The charm of anchors (H4a) has a total effect of 0.177, with 9.60% mediated; professionalism (H4b) shows a total effect of 0.169, with 14.79% mediated; interactivity (H4c) registers a total effect of 0.157, with 12.74% mediated; and spatial presence (H4d) exhibits the largest total effect

(0.245), though only 8.98% is mediated. All indirect paths have confidence intervals excluding zero, confirming statistical significance.

These results suggest that perceived value consistently serves as a cognitive-affective conduit through which live streaming attributes influence purchase intention, in line with value-based consumer decision-making theory (Zeithaml, 1988; Sweeney & Soutar, 2001). Although the direct experiential appeal of charm, professionalism, interactivity, and spatial presence remains the primary driver, the mediated pathways add explanatory depth by highlighting the evaluative processes that translate immersive experiences into behavioral intention. This reinforces the theoretical proposition that in e-commerce live streaming, sensory and content-rich scenarios not only act directly but also shape consumers' value perceptions, which in turn enhance purchase propensity.

Table 10. Mediation Effect Results (Based on research hypothesis H4a-d)

Hypothesis	Path	Item	Effect	Bias-corrected percentile 95%CI		Effect size proportion	Test Result
				Lower	Upper		
H4	E-commerce streaming scenario→Perceived Value→Purchase Intention	Live	Total Effect	0.641	0.527	0.741	100%
			direct effect	0.488	0.334	0.621	76.13%
			indirect effect	0.153	0.087	0.229	23.87%
H4a	Charm of Anchors→Perceived Value→Purchase Intention	of	Total Effect	0.177	0.093	0.252	100.00%
			direct effect	0.16	0.088	0.239	90.40%
			indirect effect	0.017	0.005	0.037	9.60%
H4b	Professionalism of Anchors→Perceived Value→Purchase Intention	of	Total Effect	0.169	0.093	0.257	100.00%
			direct effect	0.144	0.058	0.21	85.21%
			indirect effect	0.025	0.01	0.056	14.79%
H4c	Interactivity→Perceived Value→Purchase Intention		Total Effect	0.157	0.063	0.247	100.00%
			direct effect	0.137	0.053	0.231	87.26%
			indirect effect	0.02	0.004	0.04	12.74%
H4d	Spatial Presence→Perceived Value→Purchase Intention		Total Effect	0.245	0.186	0.342	100.00%
			direct effect	0.223	0.159	0.303	91.02%
			indirect effect	0.022	0.006	0.046	8.98%

4.12 Hypothesis Test Results

The hypothesis testing results presented in Table 16 provide a comprehensive validation of the proposed research model, confirming all 17 hypothesized relationships. Specifically, the live-streaming e-commerce scenario significantly influences both consumers' perceived value and purchase intention (H1, H2), while anchor-related factors—charisma, professionalism, interactivity, and spatial presence—exert significant direct effects on these outcomes (H1a–H1d, H2a–H2d). Furthermore, perceived value was verified as a key mediating variable, partially mediating the influence of live-streaming scenario attributes on purchase intention (H3, H4a–H4d). The full acceptance of these hypotheses reinforces the structural integrity of the model and underscores the critical role of perceived experiential value in driving consumer behavioral responses within the context of fresh agricultural product live-streaming.

Table 11. Summary of Hypothesis Test Results

Research Hypothesis	Conclusions
H1: The live-streaming scenario of fresh agricultural product e-commerce has a significant positive impact on consumers' purchase intention.	Accepted
H1a: The charisma of anchors in fresh agricultural product live-streaming has a significant positive impact on consumers' purchase intention.	Accepted
H1b: The professionalism of live-streaming anchors for fresh agricultural products has a significant positive impact on consumers' purchase intention.	Accepted
H1c: The interactivity of fresh agricultural product anchors has a significant positive impact on consumers' purchase intention.	Accepted
H1d: The sense of presence in the live-streaming spaces of fresh agricultural products has a significant positive impact on consumers' purchase intention.	Accepted
H2: The live-streaming scenario of fresh agricultural product e-commerce has a significant positive impact on consumers' perceived value.	Accepted
H2a: The charisma of live-streaming anchors for fresh agricultural products has a significant positive impact on consumers' perceived value.	Accepted
H2b: The professionalism of live-streaming anchors specializing in fresh agricultural products has a significant positive impact on consumers' perceived value.	Accepted
H2c: The interactivity of live-streaming anchors for fresh agricultural products has a significant positive impact on consumers' perceived value.	Accepted
H2d: The spatial telepresence of live-streaming for fresh agricultural products has a significant positive impact on consumers' perceived value.	Accepted
H3: The perceived value of fresh agricultural product consumers has a significant positive impact on their purchase intention.	Accepted
H4: Perceived value mediates the relationship between the live-streaming scenario of fresh agricultural products and consumers' purchase intention.	Accepted
H4a: Perceived value mediates the relationship between the charisma of live-streaming anchors for fresh agricultural products and consumers' purchase intention.	Accepted
H4b: Perceived value mediates the relationship between the professionalism of live-streaming anchors for fresh agricultural products and consumers' purchase intention.	Accepted
H4c: Perceived value mediates the relationship between the interactivity of live-streaming anchors for fresh agricultural products and consumers' purchase intention.	Accepted

H4d: Perceived value mediates the relationship between the spatial presence of live-streaming for fresh agricultural products and consumers' purchase intention.

Accepted

5. DISCUSSION AND CONCLUSION

5.1 Theoretical Implications

This study enriches the theoretical understanding of consumer behavior in the context of e-commerce live streaming by constructing an extended Stimulus–Organism–Response (S-O-R) framework tailored to fresh agricultural product marketing. Departing from conventional emphases on entertainment or fashion-related goods, this research places the spotlight on a utilitarian and trust-sensitive category—fresh produce—where consumer decision-making is deeply embedded in informational asymmetry, sensory uncertainty, and value-risk evaluation. The empirical findings reveal that four core features of the live-streaming scenario—anchor charm, professionalism, interactivity, and spatial presence—not only have significant direct effects on purchase intention, but also influence it indirectly via perceived value, which serves as a partial mediator. This integrated path structure validates the theoretical soundness of the extended S-O-R model and provides a refined analytical lens for understanding digitally mediated purchasing processes.

What distinguishes this study theoretically is its expansion of the S-O-R framework along both contextual and structural dimensions. While previous literature has established the efficacy of S-O-R models in digital commerce (Alanadoly & Salem, 2022; Hewei & Youngsook, 2022; Lin & Shen, 2023), few have operationalized this framework within the fresh agricultural product domain, where sensory cues are often absent or difficult to transmit. The integration of spatial presence into the stimulus layer directly addresses this limitation. By empirically confirming that immersive visual and environmental cues enhance both perceived value and purchase intention, this research bridges a conceptual gap between presence theory and digital marketing, which has long focused primarily on interpersonal interaction or source credibility.

Moreover, the study challenges the conventional assumption that emotional arousal or entertainment are the dominant mechanisms driving consumer behavior in live-streaming (Kong et al., 2025; Liu et al., 2023). Instead, the consistent mediating role of perceived value suggests that consumer cognition—especially in terms of functional and epistemic value assessment—plays a pivotal role even in highly dynamic and affect-laden environments. This finding responds to prior calls for unpacking the cognitive-affective mechanisms in livestream commerce (Shang et al., 2023), and positions value appraisal as a robust explanatory variable for utilitarian consumption decisions.

The decomposition of the live-streaming environment into four distinct experiential attributes represents another theoretical advance. Existing studies often treated live-streaming as a monolithic or aggregate phenomenon (Luo et al., 2020), without differentiating the qualitatively different consumer responses evoked by interpersonal charisma, technical expertise, interactive behavior, and immersive presentation. By isolating and modeling the unique effects of these components, this research offers a fine-grained stimulus taxonomy that can guide future studies in designing, segmenting, or evaluating live-streaming strategies across various product categories.

Importantly, this study also highlights domain transferability of digital marketing theories. By demonstrating that constructs developed for luxury or entertainment goods—such as anchor charm or interactivity—remain effective in the marketing of low-involvement, high-risk products, the study

contributes to ongoing theoretical debates on the universality vs. contingency of consumer response frameworks in livestream commerce.

Taken together, this research enhances theoretical understanding in three interrelated ways: it advances the application boundary of the S-O-R model by embedding it in an underexplored product domain; it clarifies the central cognitive pathway through which digital experiences influence behavioral intention; and it decomposes complex experiential stimuli into discrete and theoretically interpretable subdimensions. These contributions offer a substantial theoretical foundation for subsequent inquiry into trust, engagement, and value construction in digitally mediated environments.

5.2 Practical Implications

The findings of this study offer valuable strategic insights for multiple stakeholders involved in the development of fresh agricultural product live-streaming, including agricultural producers, platform operators, live-streaming anchors, and policymakers. The empirical evidence highlights that consumers' purchase intention is not only shaped by the experiential stimuli of live-streaming scenarios but also critically mediated by their perceived value of the product. This mechanism suggests a shift from solely traffic-driven models toward value-centric engagement strategies, necessitating multi-level adjustments across the live-streaming ecosystem.

For agricultural producers and cooperatives, the study underscores the importance of professionalizing live-streaming operations. While charm and charisma of anchors contribute to initial viewer engagement, professionalism—manifested in product expertise, transparent communication, and reliable demonstrations—emerges as a decisive factor in shaping consumer trust and purchase intention. Producers should therefore collaborate with anchors who possess domain-specific knowledge, or invest in training programs that enable grassroots farmers to articulate product attributes effectively in live-stream sessions. Additionally, aligning product presentation with consumers' functional and emotional value expectations—such as emphasizing freshness assurance and showcasing origin stories—can further reinforce consumer perceptions.

For live-streaming platform operators, the findings indicate that enhancing spatial presence and interactivity is pivotal in elevating perceived consumer value. Platforms should prioritize developing immersive technologies, such as high-definition multi-angle displays, VR-enhanced virtual farm tours, and real-time freshness certification tools, to mitigate sensory limitations inherent in online fresh produce sales. Furthermore, improving interactive functionalities—like real-time Q&A moderation, AI-driven personalized recommendations, and live-feedback mechanisms—can strengthen consumer engagement and foster a participatory shopping atmosphere. These enhancements not only improve conversion rates but also differentiate platforms in an increasingly competitive digital marketplace.

For live-streaming anchors and influencers, the study suggests a strategic recalibration of performance tactics. Anchors should move beyond superficial entertainment-oriented approaches and focus on building multi-dimensional value resonance with consumers. This includes crafting narratives that link product attributes to emotional and social values, such as health-conscious consumption, environmental sustainability, or community support. By adopting a hybrid communication style that blends charisma with professional authority, anchors can more effectively cultivate consumer trust and loyalty in categories traditionally perceived as high-risk or ambiguous.

From a policy-making perspective, the findings highlight the necessity of institutional support in democratizing live-streaming resources. Given that spatial presence and interactivity significantly impact consumer purchase decisions, governments and agricultural bureaus should provide infrastructure subsidies, technical training, and digital literacy programs targeted at small-scale farmers and rural

entrepreneurs. Additionally, implementing standardized quality verification systems—such as blockchain-based supply chain tracking and live certification protocols—can enhance consumer confidence in product authenticity, addressing prevalent trust deficits in the fresh produce sector.

In practical terms, a coordinated approach is required where producers focus on enhancing product storytelling and anchor professionalism, platforms invest in technological immersion and interactive tools, and policymakers foster an enabling environment through infrastructure and credibility-building initiatives. Only through such multi-stakeholder collaboration can the live-streaming commerce of fresh agricultural products transition from a traffic-driven spectacle to a value-oriented, trust-centric, and sustainable business model.

5.3 Conclusion

This study systematically explored the influence mechanism of live-streaming e-commerce scenarios on consumers' purchase intention toward fresh agricultural products, with perceived value serving as a key mediating variable. Grounded in the integrated theoretical framework of the Stimulus–Organism–Response (S-O-R) model and Perceived Value Theory, the research identified four core experiential stimuli—anchor charm, professionalism, interactivity, and spatial presence—as significant antecedents impacting consumers' cognitive evaluations and behavioral intentions. Through a structural equation modeling analysis of 415 valid samples, the study empirically validated that these live-streaming attributes exert both direct and indirect effects on purchase intention, with perceived value functioning as a partial mediator. Furthermore, the differential analysis revealed that factors such as age, education, occupation, and income influence consumers' evaluative responses to live-streaming stimuli, thereby enriching the understanding of consumer segmentation in the context of agricultural live-streaming commerce.

Theoretically, this study contributes to the literature by extending the application of the S-O-R framework to the underexplored domain of fresh agricultural product live-streaming, emphasizing the mediating role of perceived value in bridging experiential stimuli and purchase behavior. By delineating the distinct explanatory power of anchor characteristics and immersive environmental cues, the research offers a refined perspective on how value cognition shapes consumer decisions in digital commerce environments. Practically, the findings provide actionable insights for agricultural producers, platform operators, and policymakers to develop strategies that enhance professionalism, immersive experiences, and trust-building mechanisms, thereby optimizing consumer engagement and promoting sustainable rural e-commerce development.

However, this study is not without limitations. Firstly, the cross-sectional design restricts the ability to capture dynamic behavioral changes over time, suggesting the need for longitudinal studies to examine how consumers' perceptions and purchase behaviors evolve with continuous exposure to live-streaming environments. Secondly, the sample, though diverse, is limited to Chinese consumers, which may constrain the generalizability of the findings across different cultural and market contexts. Future research could expand to cross-regional comparative analyses to explore cultural variances in live-streaming consumption behavior. Lastly, this study primarily focused on the mediating role of perceived value, whereas potential moderating variables—such as consumer trust propensity, product involvement level, or platform credibility—were not incorporated. Subsequent studies could integrate these contextual factors to further enrich the explanatory power of the model and provide a more comprehensive understanding of consumer decision-making in live-streaming commerce.

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Appendix 1.

No	Variable	5	4	3	2	1
Part 1. Anchor's Charm						
1	The good image of agricultural product e-commerce anchors has a strong attraction to viewers.					
2	The clear expression of agricultural product e-commerce anchors has a strong attraction to you.					
3	The humor and unique style of agricultural e-commerce anchors have a strong attraction to you.					
Part 2. Anchor's Professionalism						
4	The professional language used by agricultural product e-commerce anchors to introduce product features can generate your interest in purchasing products.					
5	Agricultural product e-commerce anchors pay attention to the details of fresh agricultural products and recommend them, which can generate your interest in purchasing the products.					

Agricultural product e-commerce anchors using innovative ways to
6 showcase product recommendations can generate your interest in purchasing
products.

Part 3. Anchor's Interactivity

7 Do you think it is very important for agricultural product e-commerce
anchors to actively respond to consumer questions during live broadcasts.

8 Do you think it is very important for agricultural product e-commerce
anchors to display product details according to audience requirements during
live broadcasts.

9 Do you think it is very important for agricultural product e-commerce
anchors to be good at controlling the pace of the live broadcast process.

Part 4. Anchor's Spatial Presence

10 When watching live broadcasts of agricultural product e-commerce, you can
feel the strong authenticity of the products

11 When you watch live broadcasts of agricultural product e-commerce, you
have a real shopping experience.

12 When you watch live broadcasts of agricultural product e-commerce, you
can feel the immersive environment of the live broadcast

13 When you watch the live broadcast of agricultural product e-commerce, you
can feel like you are in the live room.

Part 5. Consumer Perceived Value

14 You pay attention to the freshness and health level of agricultural product e-
commerce live streaming products.

15 You pay attention to the quality level of agricultural product e-commerce
live streaming products.

16 You pay attention to the cost-effectiveness of agricultural product e-
commerce live streaming products

17 By watching live broadcasts of agricultural product e-commerce, you can
increase your understanding of the product

18 You can feel a sense of pleasure while watching the live broadcast of
agricultural product e-commerce.

19 You are very concerned about the after-sales evaluation of agricultural
product e-commerce live streaming platforms.

20 You are very concerned about the service guarantee provided by the
agricultural product e-commerce live streaming platform.

21 You are very concerned about the credibility and reputation of agricultural
product e-commerce live streaming platforms.

22 After watching the live broadcast of agricultural product e-commerce, are
you willing to purchase the products you learned about during the live
broadcast.

23 When watching live broadcasts of agricultural product e-commerce, you
may consider purchasing the introduced products directly.

24 If you have actual needs during the process of watching agricultural product
e-commerce live broadcasts, you are willing to purchase products in the live
broadcast room.
