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Mediating Role of Perceived Utilitarian and Entertainment Values between E-Commerce Live Streamer Popularity and Customer Purchase Intention

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Abstract

The existing research has established the significance of live streamer popularity and its underlying mechanisms of influence, particularly the mediating pathways through customers' psychological perceptions, warranting deeper investigation. Grounded in the Stimulus-Organism-Response theory, the Stimulus-Response theory, and the Perceived Value theory, this study constructs a theoretical model that incorporates perceived utilitarian value and perceived entertainment value as dual mediators. The aim is to systematically unravel the pathways through which the popularity of e-commerce live streamers affects customer purchase intention. By administering a questionnaire survey to 443 customers with live-streaming shopping experience in Shandong Province, China, and employing Partial Least Squares Structural Equation Modeling (PLS-SEM) for data analysis, the findings reveal that e-commerce live-streamer popularity has a significant, positive, direct effect on customer purchase intention. Furthermore, perceived utilitarian value and perceived entertainment value not only individually demonstrate significant positive effects on purchase intention but also play significant partial mediating roles in the relationship between popularity and purchase intention. Both mediating pathways are validated and are identified as complementary partial mediations. By empirically examining the dual mediating mechanisms of perceived value, this research deepens understanding of the intrinsic logic underlying customer decision-making in the e-commerce live-streaming context. It not only enriches the applicability of the Stimulus-Organism-Response theory, the Stimulus-Response theory, and the Perceived Value theory in interactive media but also provides a theoretical foundation and practical insights for the refined operations of e-commerce platforms, brands, and live streamers. Specifically, it underscores the importance of simultaneously enhancing customers' rational, utilitarian perceptions and their emotional, hedonic experiences to effectively translate a live streamer's influential reach into sustained purchase intention.

Keywords: Customer purchase intention, E-commerce live streamer popularity, Perceived utilitarian value, Perceived entertainment value

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Introduction

Amidst the global surge of the digital economy, Customer shopping behaviour has undergone profound transformations. Customer purchase intention, as the most direct antecedent variable for predicting actual purchasing behaviour, remains a core research topic in marketing and consumer behaviour studies (Fishbein & Ajzen, 1975). Analysing the driving factors of purchase intention not only enriches customer decision-making theories but also provides precise guidance for marketing strategies in commercial practice. Electronic commerce, as a disruptive mode of circulating goods and services, has evolved from a supplementary channel in its early days to a central pillar of modern retailing (Zhu et al., 2020). With technological iteration and shifts in Customer habits, each advancement in media formats has reshaped the relationship between "people, products, and context" (Tang et al., 2020). Among these, e-commerce live streaming, leveraging its real-time, interactive, and contextualised features, has successfully created a new consumption field by integrating product demonstration, content dissemination, social connection, and instant transactions (Li et al., 2025), becoming a key engine driving e-commerce growth.

Within the complex ecosystem of e-commerce live streaming, the e-commerce live streamer undoubtedly acts as the central node connecting brands, products, and customers (Gong et al., 2023). Unlike traditional celebrity endorsements or advertising models, e-commerce live streamers often profoundly influence viewers' cognition and emotion, and consequently their purchase decisions, through professional knowledge explanation, vivid scenario portrayal, sustained emotional interaction, and the establishment of a parasocial relationship with the audience (Zhao & Wang, 2021). The success of professional live streamers like Dong Yuhui has made live streaming a coveted profession. As the protagonists of the live streaming industry, live streamers have propelled its prosperity, creating millions of employment opportunities. According to the 2021 Taobao Live Streaming Ecosystem Development Report, Taobao Live has cultivated a large number of well-known live salespeople, with over 400 live-streaming rooms achieving monthly sales exceeding 1 million yuan. Female live streamers constitute a high proportion, exceeding 80% overall. Regarding age structure, Taobao live streamers span a wide range from the 60s to the 00s, with the 90s generation accounting for the highest share. To build a live streamer with over a million followers, beyond the efforts of professional teams, the most crucial factor is the live streamer's own characteristics.

Today, live streaming is not merely a marketing tool but an infrastructure. In live streaming rooms, customers can gain deeper insights into first-hand information such as the production process, product features, and experience sharing, thereby obtaining more clues for purchase. Live streamers assist customers in understanding product information. Major e-commerce platforms have established dedicated live streamer departments responsible for contracting or training live streamers. For example, during the 2022 Double 11 shopping festival, star Liu Tao sold goods worth a total of 21.51 million USD within 4 hours. It is evident that the role of live streamers in customer behaviour is becoming increasingly significant, and the sales performance of e-commerce live streamers continues to reach new highs. High-quality e-commerce live streamers have thus become the core competitiveness of e-commerce platforms. Among various factors, the popularity of e-commerce live streamers, that is, the extent to which they are known and recognised within the target audience, acts as a key extrinsic characteristic variable, significantly influencing Customer decision-making through credibility endorsement, social proof, and the attractiveness effect. Highly popular live streamers, leveraging their large fan base and media exposure, can reduce Customers' perceived risk and stimulate the bandwagon effect (Shi, 2019). However, the mechanism of popularity is not a simple linear transmission. Empirical research indicates that the underlying motivation for Customers' final purchase decisions stems from their assessment of the perceived value derived from the shopping process (Zeithaml, 1988), particularly the dual drivers of perceived utilitarian value and perceived entertainment value (Boksberger & Melsen, 2011).

A significant research gap currently exists. Although the relationship between e-commerce live streamer popularity and perceived value has been preliminarily verified (Li et al., 2025), the mechanism of how popularity affects customer purchase intention through the dual mediation of

perceived value has not been systematically studied. Especially in the Asian market, where Customer decision-making tends to be more rational, further investigation into the differentiated mediating paths of perceived value is needed. This study aims to examine the context of e-commerce live streaming, and the popularity of e-commerce live-streamers shaping customers' perceived value, ultimately influencing their purchase intention. Specifically, this research will focus on perceived utilitarian value and perceived entertainment value. The former pertains to customers' evaluation of utilitarian benefits such as shopping efficiency, information quality, and economic gains; the latter concerns the emotional benefits of pleasure, immersion, and enjoyment experienced by customers while watching the live stream. Based on prior scholarly work, a live streamer's popularity, as an external influence variable, enhances customers' utilitarian assessment of information usefulness and transaction reliability through the credibility mechanism, while also improving the entertainment experience during consumption through attractiveness and appeal. These reinforced perceptions of value constitute the psychological bridge that drives the formation of purchase intention. Based on this, the present study proposes the following specific objectives:

RO1. To examine the relationship between e-commerce live streamer popularity and customer purchase intention.
RO2. To investigate the effects of perceived utilitarian value and perceived entertainment value on customer purchase intention.
RO3. To assess the mediating roles of perceived utilitarian value and perceived entertainment value between e-commerce live streamer characteristics and customer purchase intention.

Based on this premise, the present study proposes a central proposition: in the context of e-commerce live streaming, e-commerce live streamer popularity indirectly drives customer purchase intention by enhancing customers' perceived utilitarian value and perceived entertainment value. The theoretical significance of this study lies in enriching the theoretical model of Consumer behavior in e-commerce live streaming by introducing the dual-mediation perspective of perceived value and employing the stimulus-organism theory and the stimulus-organism-response theory. On a practical level, the research findings provide insights for e-commerce platforms, brands, and e-commerce live streamers themselves to refine their operational strategies, offering solutions such as value-enhancement strategies for top-tier e-commerce live streamers and breakthrough pathways for emerging e-commerce live streamers.

Literature Review

Purchase intention is a core construct in Consumer behavior research, referring to the subjective probability or likelihood that a customer will take a specific purchasing action. In their classic theory of planned behaviour, Fishbein and Ajzen (1975) posited that behavioural intention is the most direct antecedent of actual behaviour, with purchase intention representing a specific type of behavioural intention. In recent years, as e-commerce live streaming has rapidly developed, scholars have begun to focus on the drivers of purchase intention in this context. Research has found that, compared to traditional e-commerce, purchase intention in e-commerce live streaming is influenced not only by product attributes but also significantly by the popularity of the live streamer. Purchasing behaviour within a live stream often reflects real-time decisions in a social, emotionally arousing context, providing a novel context for studying purchase intention.

In e-commerce live-streaming research, the stimulus-organism-response (S-O-R) theory, due to its strong explanatory power and adaptability, has been widely adopted and has proven to be a robust framework for understanding customer behaviour in this context (Zhu et al., 2023). The core of this theory lies in introducing the 'organism' as a mediating variable, emphasising that behaviour is not a simple, direct response to external stimuli.

Instead, stimuli first affect an individual's internal cognitive and affective states, which then lead to specific behaviours. As a cornerstone of behaviourist psychology, the stimulus-response (S-R) theory posits that observable external stimuli are the direct cause of individual behaviour (Li, 2012). In marketing, this paradigm is reflected in the design of various marketing stimuli aimed at directly eliciting customer purchase behaviour responses (Xin, 2018). Perceived value theory is central to Consumer behavior research. It suggests that customer decisions ultimately stem from an overall assessment of the value to be gained. As research has deepened, perceived value is commonly accepted as a multidimensional construct, with perceived utilitarian and entertainment value among its most central dimensions (Chen et al., 2018).

These three theories provide complementary, systematic explanations of the mechanisms examined in this study. Firstly, the S-O-R theory constitutes the pillar of the overall framework, clearly outlining the complete causal chain of 'external stimulus → internal state → behavioural response'. Secondly, the S-R theory supplements the framework by acknowledging the potential for a direct effect path of popularity, thereby making the model more comprehensive by encompassing two possible ways in which stimuli can affect behaviour. Finally, perceived value theory imbues the 'organism' variable within the S-O-R framework with a clear, operational dual connotation. It makes the abstract internal state more concrete and provides a solid theoretical foundation for its role as a key mediating variable.

E-commerce Live Streamer Popularity (PO)

In the e-commerce live-streaming ecosystem, a live streamer's popularity is a core indicator of their commercial value and influence. Hou et al. (2025) succinctly define it as "the ability to attract a large audience", highlighting its fundamental role in aggregating viewership and market appeal. Based on existing literature, the significant effect of e-commerce live streamer popularity on customer purchase intention has received multi-dimensional empirical support. Research by Yang et al. (2023) confirmed that the more followers a live streamer has, the higher their live streaming sales, providing the most direct evidence of the popularity effect based on viewer traffic. Hou et al. (2025) noted that the ability to attract a large audience is a core attribute of an influencer. Ma's (2021) research further elucidates that popular live streamers are key opinion leaders, and the size of their following amplifies their perceived opinion leadership, making their recommendations more persuasive. Based on this, the present study proposes the following hypothesis:

H1: E-commerce live streamer popularity has a significant positive effect on customer purchase intention.

Perceived value, a core construct in Consumer behavior, refers to the customer's overall assessment of a product's utility based on a trade-off between benefits and sacrifices. The immersive and social nature of e-commerce live streaming has driven perceived value research to evolve from a unidimensional functional cost perspective to a multidimensional integrated framework.

Perceived Utilitarian Value (PUV)

Perceived utilitarian value originates from classical utilitarian philosophy. In the Consumer behavior domain, it emphasises the instrumental and purposive nature of consumption. Its essence lies in the customer's rational calculus of gains and losses, representing a goal-oriented, rational evaluation. Akram et al.'s (2021) research clearly indicates that utilitarian motivation is associated with rational, critical, decision-effective, and goal-oriented tasks. Childers et al. (2001) confirmed that, from a utilitarian perspective, customers are concerned with purchasing products efficiently and in a timely

manner with minimal hassle to achieve their goals. Laradi et al. (2024) posited that perceived utilitarian value is driven by the feeling of goal achievement during the shopping process, and this value perception logically links to a stronger purchase intention.

Regarding research on the mediating pathway through which perceived utilitarian value influences purchase intention, Yu et al. (2025) found that during live streaming, e-commerce live streamers emphasise product cost-effectiveness, scarcity, and other features, thereby further strengthening customers' perceived utilitarian value. The findings of Chiu et al. (2014) clearly indicate that after successfully purchasing a desired product from an online store, customers remember this positive experience and are likely to shop again at the same store. Research by Laradi et al. (2024) also supports this, suggesting that the perceived utilitarian value customers experience is driven by the feeling of achieving goals during the shopping process, making it logical to link perceived utilitarian value to a greater likelihood of purchase intention. The research by Wu and Huang (2023) delves deeper into this point, proposing that by enhancing perceived utilitarian value through live streaming, customer uncertainty regarding the stream and the product should be alleviated, and their benefit-related needs met, thereby strengthening trust and purchase intention. Based on this, the present study proposes the following hypotheses:

H2: Perceived utilitarian value has a significant positive effect on customer purchase intention.

H3: Perceived utilitarian value will play a significant mediating role between e-commerce live streamer popularity and customer purchase intention.

Perceived Entertainment Value (PEV)

In Consumer behavior and marketing research, perceived entertainment value is a core construct for understanding customer affective experience, immersion, and non-rational decision-making. Within the highly affective and interactive context of e-commerce live streaming, an in-depth examination of perceived entertainment value is crucial for both theoretical and practical significance. Chen (2025) points out that perceived entertainment value is an attribute that can facilitate the generation of pleasurable emotions in customers. Ma (2021) emphasised that live streamers enhance the entertainment value of their broadcasts through elements like humour and interactive games. Zhang et al. (2024) further found that the affective trust generated by entertainment value is often directed towards the e-commerce live streamer rather than the product itself.

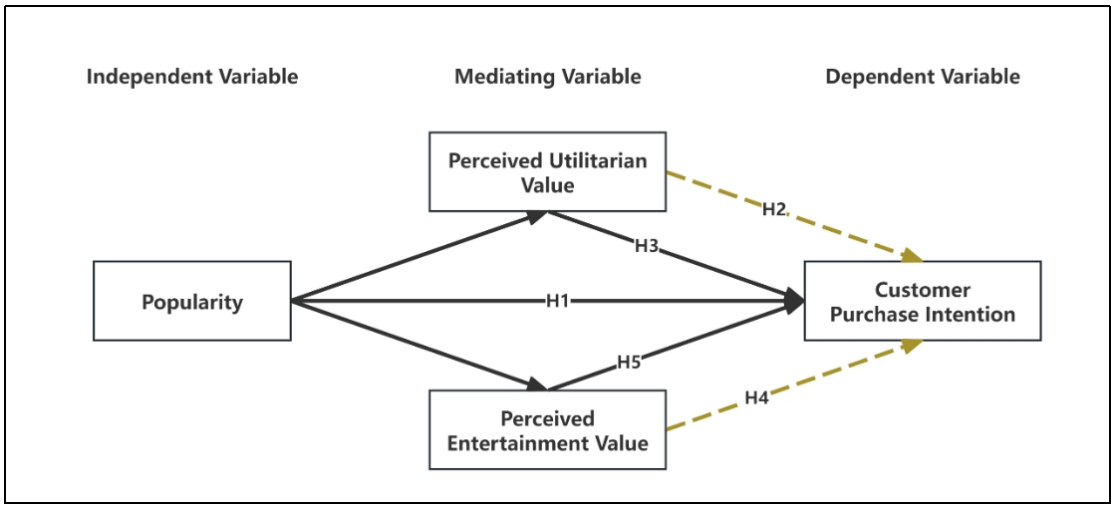

Figure 1: Research Framework

Regarding research on the mediating role of perceived entertainment value in influencing purchase intention, Yu et al. (2025) found that when customers experience emotions such as joy, excitement,

and satisfaction while watching a live stream, they are more likely to develop stronger impulse purchase intentions. Chen et al. (2024) introduced the concept of affective trust, which reflects a positive emotional connection. When users have an affective dependence on the live streamer, they are more likely to receive emotional stimulation and be in a pleasant affective state. Zhu et al. (2023) found that greater customer enjoyment is associated with higher repurchase intention. Based on this, the present study proposes the following hypotheses:

H4: Perceived entertainment value has a significant positive effect on customer purchase intention.

H5: Perceived entertainment value will play a significant mediating role between e-commerce live streamer popularity and customer purchase intention.

Research Methodology

This empirical study was conducted in Shandong Province. According to 2024 data from CEIC Data, the number of active e-commerce live streaming users in Shandong Province is 42.739 million. The sample population for this study comprises Customers who are 18 years of age or older, possess full civil capacity, have shopped via e-commerce live streaming within the past year, and are currently permanent residents of Shandong Province. To ensure the sample is highly relevant and informative, a purposive sampling method was employed to secure a representative sample. According to the Krejcie formula, a minimum sample size of 384 is required (Krejcie & Morgan, 1970). The questionnaire for this study was distributed through the Chinese online survey platform "Questionnaire Star". A total of 472 responses were successfully collected. After data cleaning and screening, 11 questionnaires were excluded because the IP addresses were not located in Shandong Province or the respondents were under 18 years of age. A further 4 responses were excluded due to excessively short completion times. Consequently, 457 valid samples were retained for analysis.

This study employed a 5-point Likert scale (from 1 = strongly disagree to 5 = strongly agree) to collect quantitative data for assessing the variables. The questionnaire consisted of seven parts. The first half introduced the research topic and instructions for respondents, collected participants' demographic information, and assessed their familiarity with the research topic and domain through items such as the duration of watching e-commerce live streams and the average length of each viewing session. This was done to verify that respondents possessed sufficient knowledge to answer the related questions. The latter half of the questionnaire explored the effects of the variables on the respondents. An 'adaptation' strategy was adopted, which involved drawing upon and contextually fine-tuning established scales from existing literature that have been repeatedly validated. Scales from Shi Pengfei (2019), Men Jinqi (2022), Han Xiaoyi (2020), and Liu Shilin (2024) were referenced and integrated. The reliability of these scales has been verified in prior studies, with Cronbach's alpha coefficients exceeding 0.7, providing strong evidence of their reliability and validity. The scales were appropriately revised to reflect the characteristics of e-commerce live streaming, resulting in 20 items, 5 for each variable. Data analysis was performed using SPSS and SmartPLS.

Results and Analysis

Following data screening and cleaning for missing values and outliers, and in accordance with the handling principles proposed by Hair et al. (2021), extreme outliers clearly resulting from errors were removed. This resulted in 443 valid samples being retained for analysis. Table 1 summarises the demographic statistics. Regarding gender, females constituted the majority, accounting for 52.60% of the sample, indicating a relatively balanced gender distribution. In terms of age distribution, respondents aged 31 to 40 comprised the largest

group, accounting for 35.44% of the sample, suggesting that middle-aged and young adults are the primary demographic for live-streaming shopping. Concerning educational attainment, the largest proportion of the sample held an 'Undergraduate' degree, accounting for 43.12%. From an occupational perspective, 'Enterprise employees' were relatively numerous, making up 34.76% of the sample. Regarding monthly expenditure on e-commerce live streaming, the 'RMB 1,001-3,000' range was the most common, at 34.09%. Among those who watched e-commerce live streams, 39.50% of the sample selected '2~5 years'. Regarding the distribution of duration per e-commerce live-streaming viewing session, the majority of the sample reported "less than 0.5 hours," totalling 152.0 individuals (34.31% of the sample).

Table 1: Demographic Data

Items	Categories	Sample Size	Percent (%)
Gender	Male	210	47.40
	Female	233	52.60
Age	18 to 30 years old	147	33.18
	31 - 40 years old	157	35.44
	41 - 50 years old	80	18.06
	Over 50 years old	59	13.32
Education	High school and below	42	9.48
	Junior college	132	29.80
	Undergraduate degree	191	43.12
	Master's degree	46	10.38
	Doctorate or above	32	7.22
Occupation	Civil servants or staff members of public institutions	97	21.90
	Enterprise employees	154	34.76
	Self-employed individual	75	16.93
	Student	85	19.19
	Other	32	7.22
Monthly expenditure on e-commerce live streaming	0 - 1000 yuan	120	27.09
	1001 - 3000 yuan	151	34.09
	3001 - 5000 yuan	87	19.64
	5000 - 10000 yuan	51	11.51
	10000 yuan and above	34	7.67
Duration of watching e-commerce live streaming	half a year	25	5.64
	0.5 - 1 year	63	14.22
	1 - 2 years	106	23.93
	2 - 5 years	175	39.50
	5 years and above	74	16.70
The duration of each time watching an e-commerce live streaming	Less than 0.5 hour	152	34.31
	0.5 - 1 hour	121	27.31
	1 to 2 hours	86	19.41
	2 - 3 hours	55	12.42
	More than 3 hours	29	6.55

Following data cleaning and demographic analysis, this study conducted a descriptive statistical analysis of the measurement items for the core constructs. In descriptive statistical analysis, metrics such as the mean and standard deviation are typically used to gauge the basic level of each variable. Table 2 presents detailed statistical measures for each variable, including minimum, maximum, mean, standard deviation, skewness, and kurtosis.

Table 2: Descriptive Statistics

Name	Sample Size	Minimum	Maximum	Mean	Standard Deviation	Skewness	Kernel
CPI1	443	1	5	3.650	0.913	-0.039	-0.782
CPI2	443	1	5	3.474	0.994	-0.032	-0.707
CPI3	443	1	5	3.643	0.936	-0.180	-0.623
CPI4	443	1	5	3.668	0.954	-0.252	-0.584
CPI5	443	1	5	3.691	0.964	-0.261	-0.624
PO1	443	1	5	3.564	0.997	-0.323	-0.365
PO2	443	1	5	3.598	0.980	-0.183	-0.664
PO3	443	1	5	3.535	1.076	-0.315	-0.525
PO4	443	1	5	3.372	1.088	-0.093	-0.837
PO5	443	1	5	3.479	1.071	-0.333	-0.477
PEV1	443	1	5	3.474	1.116	-0.376	-0.575
PEV2	443	1	5	3.587	1.017	-0.399	-0.326
PEV3	443	1	5	3.668	0.956	-0.308	-0.488
PEV4	443	1	5	3.400	1.126	-0.173	-0.787
PEV5	443	1	5	3.576	0.987	-0.148	-0.704
PUV1	443	1	5	3.291	1.008	-0.023	-0.298
PUV2	443	1	5	3.339	1.048	0.000	-0.591
PUV3	443	1	5	3.415	1.057	-0.117	-0.610
PUV4	443	1	5	3.438	0.941	0.058	-0.463
PUV5	443	1	5	3.366	1.047	-0.086	-0.605

As shown in the table above, the mean values for all variables range from 3.291 to 3.691. This indicates that, overall, respondents hold a positive attitude towards the popularity of e-commerce live streamers and have gained positive perceptions of utilitarian and entertainment value from live-streaming purchases, thereby demonstrating a clear customer purchase intention. The standard deviations range from 0.913 to 1.126, indicating a reasonable level of data dispersion that reflects perceptual differences among individual respondents. Skewness and kurtosis metrics are commonly used to assess normality. If the skewness and kurtosis indices are between -2 and 2, the data are judged to be normally distributed (Ong et al., 2024; Zhang et al., 2024). The absolute values of skewness for all items are less than 1, and the absolute values of kurtosis are also less than 1, indicating a moderately positive overall distribution.

Structural Equation Modelling

When selecting research analysis methods, a close alignment with the specific research objectives and the characteristics of the data is essential, as different statistical techniques serve distinct functions in this process. In recent years, structural equation modelling based on partial least squares (PLS-SEM) has become increasingly widespread in the social sciences, serving as a vital tool for analysing complex relationships and conducting predictive research. Having comprehensively considered the research purpose alongside the methodological recommendations proposed by Hair et al. (2021), this study decided to adopt PLS-SEM as the core data analysis technique.

The measurement model primarily reflects the relationship between latent variables and their observed indicators (Hair et al., 2021). Before examining the path relationships involved in the structural model, the measurement model must first be adequately assessed. The analysis of the measurement model aims to clarify the internal relationships among constructs and the correlations between constructs and their corresponding measurement items. A systematic assessment of the measurement model can provide reliable evidence for outer loadings, composite reliability, Cronbach's alpha coefficient, average variance extracted (AVE), and discriminant validity. This, in turn, helps researchers identify and eliminate measurement items or factors with low factor loadings and AVE values (Hair et al., 2021).

Assessment of Measurement Model

In this stage, the convergent validity and discriminant validity of the variables used in this study were assessed.

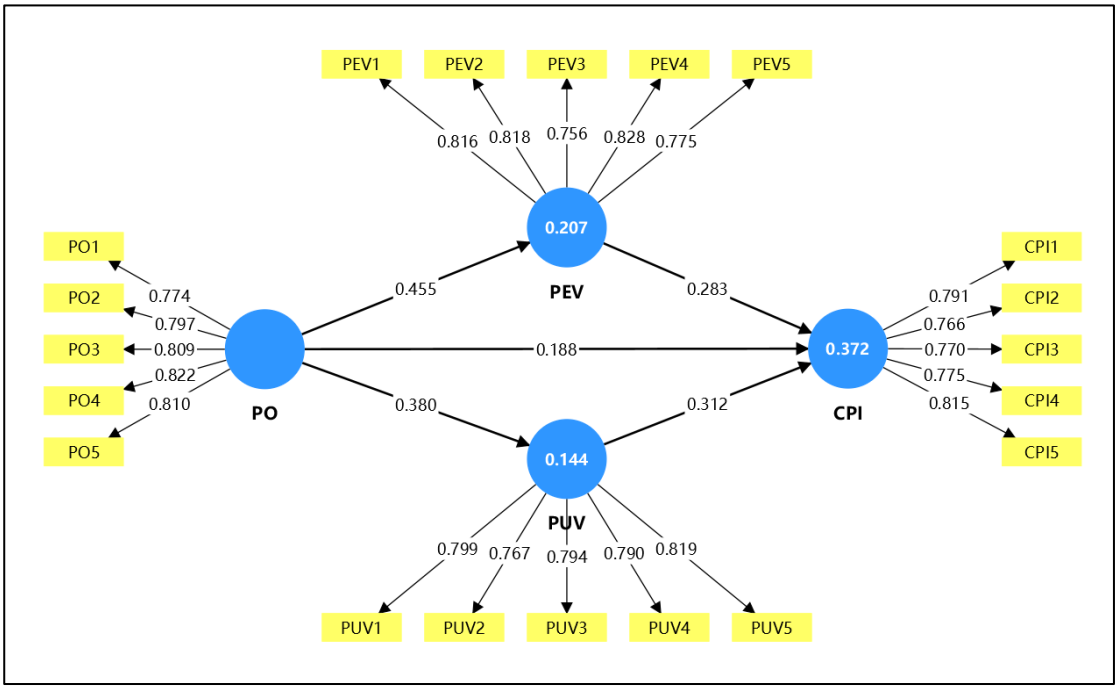

Figure 1: Evaluation of the measurement model

Assessment of Reliability and Validity

A common metric for assessing reliability is Cronbach's alpha coefficient; a higher coefficient indicates greater scale reliability. Convergent validity refers to "the degree to which a measure correlates with other measures of the same construct" (Hair et al., 2021). In a reflective measurement model, where the relationship between observed variables and their corresponding latent variables is reflective, multiple indicators are typically required to represent a single construct. These items should capture the same underlying trait and exhibit high shared variance, indicating strong convergent validity (Lim, 2024). To systematically evaluate this internal consistency reliability, metrics such as Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE) are commonly used for comprehensive judgment. Table 3 presents the results of the convergent validity assessment for a specific latent variable based on factor loadings and AVE. The table systematically lists the loading values for each item on its corresponding construct, along with the CR and AVE values, thereby providing a clear quantitative basis for assessing the measurement model's convergent properties. This study used SmartPLS 4.0 to analyse the data for reliability and convergent validity; the data analysis results are shown in the table below.

Table 3: Convergent Validity

Factor	Title	Factor Loading	Cronbach's Alpha	Composite Reliability	AVE
Customer Purchase Intention (CPI)	CPI1	0.791	0.843	0.888	0.614
	CPI2	0.766			
	CPI3	0.770			
	CPI4	0.775			
	CPI5	0.815			
Perceived Entertainment Value (PEV)	PEV1	0.816	0.858	0.898	0.638
	PEV2	0.818			
	PEV3	0.756			
	PEV4	0.828			
	PEV5	0.775			
Popularity (PO)	PO1	0.774	0.862	0.900	0.644
	PO2	0.797			
	PO3	0.809			
	PO4	0.822			
	PO5	0.810			
Perceived Utilitarian Value (PUV)	PUV1	0.799	0.853	0.895	0.631
	PUV2	0.767			
	PUV3	0.794			
	PUV4	0.790			
	PUV5	0.819			

As shown in the table above, reliability, composite reliability, and convergent validity passed the tests conducted via SmartPLS 4.0. The Cronbach's alpha coefficients for all variables ranged from 0.843 to 0.862, all exceeding 0.70. The factor loadings for all items across variables ranged from 0.756 to 0.828, all of which were above 0.70. The composite reliability (CR) values for all variables ranged from 0.888 to 0.900, all of which were above 0.70. The average variance extracted (AVE) values for all variables ranged from 0.614 to 0.644, all of which were above 0.50. These results indicate that the questionnaire used in this study possesses good convergent validity.

Assessment of Discriminant Validity

Discriminant validity refers to the statistical demonstration in a measurement model that a latent variable is effectively distinct from other latent variables. Establishing sound discriminant validity implies that each construct possesses its uniqueness, representing an independent phenomenon that cannot be explained by other variables, thereby ensuring no redundancy or confusion exists between different concepts within the model.

To comprehensively verify discriminant validity, this study employed multiple mainstream statistical methods for a comprehensive assessment, including cross-loadings analysis, the Fornell-Larcker criterion, and the Heterotrait-Monotrait ratio (HTMT). Each method provides evidence for discriminant validity from a different perspective, collectively enhancing the robustness and persuasiveness of the conclusions.

Cross-Loading Criteria of Discriminant Validity

Firstly, discriminant validity is considered established when an indicator's outer loading on its associated construct is higher than any of its cross-loadings (i.e., its correlations) with other constructs. Table 4 presents the inspection results based on the cross-loadings criterion. The findings indicate that, for each indicator, its outer loading on the associated construct is higher than any cross-loading with other constructs, suggesting good discriminant validity.

Table 4: Cross Loadings

	CPI	PEV	PO	PUV
CPI1	**0.791**	0.396	0.318	0.352
CPI2	**0.766**	0.350	0.354	0.413
CPI3	**0.770**	0.339	0.335	0.370
CPI4	**0.775**	0.409	0.341	0.350
CPI5	**0.815**	0.405	0.356	0.425
PEV1	0.382	**0.816**	0.380	0.304
PEV2	0.438	**0.818**	0.396	0.312
PEV3	0.345	**0.756**	0.324	0.301
PEV4	0.410	**0.828**	0.388	0.301
PEV5	0.352	**0.775**	0.320	0.269
PO1	0.313	0.332	**0.774**	0.296
PO2	0.304	0.349	**0.797**	0.285
PO3	0.388	0.415	**0.809**	0.313
PO4	0.367	0.371	**0.822**	0.295
PO5	0.366	0.352	**0.810**	0.334
PUV1	0.387	0.260	0.271	**0.799**
PUV2	0.365	0.321	0.282	**0.767**
PUV3	0.404	0.308	0.339	**0.794**
PUV4	0.389	0.307	0.333	**0.790**
PUV5	0.394	0.282	0.276	**0.819**

Fornell-Larcker Criterion of Discriminant Validity

The Fornell-Larcker criterion requires that the square root of the AVE for each construct should be greater than the construct's highest correlation with any other construct in the model. If each latent variable satisfies this condition, the entire measurement model is considered to possess good discriminant validity.

This study strictly adhered to this discriminant criterion and performed the Fornell-Larcker test for all latent variables in the model. As shown in Table 5, the analysis results indicate that the square root of each construct's AVE is significantly greater than the absolute value of its correlation with any other variable. This finding provides robust quantitative evidence for the measurement model's discriminant validity, demonstrating that each latent variable is independently and distinctly measured. The theoretical concepts they represent are statistically separable, with no significant conceptual overlap or redundancy effects.

Table 5: Fornell-Larcker Criteria

	CPI	PEV	PO	PUV
CPI	**0.784**			
PEV	0.485	**0.799**		
PO	0.436	0.455	**0.803**	
PUV	0.489	0.373	0.380	**0.794**

HTMT Criterion of Discriminant Validity

In the assessment of discriminant validity, the Heterotrait-Monotrait ratio (HTMT) estimates the degree of distinction between latent variables by calculating the ratio of the average correlations between items measuring different constructs (heterotrait correlations) to the average correlations between items measuring the same construct (monotrait correlations). This method demonstrates good robustness to variations in loadings and sample size, making it particularly suitable for reflective measurement models.

This study also employed the HTMT method to examine the relationships among all latent variables in the model. As shown in Table 6, the HTMT values for all construct combinations are below the recommended threshold of 0.85. This indicates that the correlations between any two latent variables are reasonably low, with no issues of conceptual redundancy or excessive overlap. This result consistently demonstrates that each construct in this study possesses good statistical distinctiveness. The measurement model meets the requirements for discriminant validity, thereby providing a validity safeguard for the subsequent variable-based path analysis and hypothesis testing.

Table 6: HTMT Criteria

	CPI	PEV	PO	PUV
CPI				
PEV	0.567			
PO	0.508	0.524		
PUV	0.575	0.435	0.440	

Discriminant validity was jointly assessed through cross-loadings, the Fornell-Larcker criterion, and the HTMT ratio. The square roots of the AVEs for each latent variable were greater than their correlations with other variables, and all HTMT values were below 0.85, indicating good discriminant validity between the constructs.

Structural Model Evaluation

Following confirmation of the measurement model's reliability and validity, the next step is to evaluate the structural model. This includes examining the model's predictive power and the relationships among the structural variables.

Assessment of Multicollinearity (VIF)

In accordance with the standards proposed by Hair et al. (2021), this study used the Variance Inflation Factor (VIF) for diagnostic purposes. As shown in Table 7, the VIF values for all predictor variables range from 1.000 to 1.349, well below the critical threshold of 5.0. This indicates the absence of severe multicollinearity in the model, and the variables show good distinctiveness.

Table 7: Collinearity between the Indicators

	CPI	PEV	PO	PUV
CPI				
PEV	1.340			
PO	1.349	1.000		1.000
PUV	1.242			

Assessment of Path Coefficients

Upon confirming statistical significance, the practical importance is further evaluated through the effect size (f^2). According to Cohen (1988), f^2 values of 0.02, 0.15, and 0.35 represent small, medium, and large effect sizes, respectively. The analysis based on Table 8 reveals that PO has a significant positive effect on PEV and on PUV.

Table 8: Path Coefficient Assessment

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	f^2 values	Effect size
PEV->CPI	0.283	0.284	0.050	5.620	0.000	0.095	Small
PO->CPI	0.188	0.187	0.054	3.496	0.000	0.042	Small
PO->PEV	0.455	0.458	0.048	9.539	0.000	0.261	Medium
PO->PUV	0.380	0.384	0.050	7.545	0.000	0.169	Medium
PUV->CPI	0.312	0.314	0.050	6.199	0.000	0.125	Small

All path relationships are statistically significant ($p < 0.05$). Furthermore, the f^2 values for the effects of PEV on CPI, PO on CPI, and PUV on CPI are all below 0.15, while the f^2 values for the effects of PO on PEV and PO on PUV are all above 0.15. This indicates that, while all path relationships are statistically significant, their effect sizes fall within the "small" to "medium" range. Consequently, hypotheses H1 through H5 are all supported.

Assessment of the Coefficient of Determination (R^2)

Table 9: R^2

	R-square	R-square adjusted
CPI	0.372	0.368
PEV	0.207	0.205
PUV	0.144	0.142

As indicated in Table 9, the R-squared values for the independent variables explaining customer purchase intention, perceived entertainment value, and perceived utilitarian value are 37.2%, 20.7%, and 14.4%, respectively. This demonstrates that the exogenous variables have explanatory power for the endogenous variables, and the model fit is satisfactory.

Assessment of the Effect Size (f^2)

Table 10: f^2

	CPI	PEV	PO	PUV
CPI				
PEV	0.095			
PO	0.042	0.261		0.169
PUV	0.125			

As shown in Table 10, the f^2 values for the effects of popularity, perceived entertainment value, and perceived utilitarian value on customer purchase intention range from 0.02 to 0.15. This indicates that their independent effects on purchase intention are relatively weak, with the direct influence of any single factor being somewhat limited. Regarding the effects on perceived value, the f^2 values for the popularity effect on both perceived entertainment value and perceived utilitarian value range from

0.15 to 0.35, indicating a medium effect size. This suggests that, in e-commerce live-streaming practice, comprehensive strategies are required.

Model Fit Analysis

This study evaluated the overall model fit using the Standardized Root Mean Square Residual (SRMR) and the Normed Fit Index (NFI) (Hair et al., 2021). Considering SRMR, NFI, and supplementary indices collectively, the structural model in this study achieves a good level of fit (SRMR = 0.049, NFI = 0.903). The theoretical framework shows strong consistency with the empirical data from the Shandong e-commerce live-streaming market. This result validates the reasonableness of the pathway mechanism through which popularity influences purchase intention via perceived value, providing statistical support for the research hypotheses.

Table 11: PLS Predict

	Q^2predict	PLS-SEM_RMSE	PLS-SEM_MAE	LM_RMSE	LM_MAE
CPI1	0.097	0.869	0.708	0.873	0.718
CPI2	0.121	0.933	**0.765**	0.938	0.764
CPI3	0.109	0.885	0.713	0.891	0.718
CPI4	0.111	0.900	0.719	0.903	0.719
CPI5	0.122	0.904	0.734	0.907	0.739
PEV1	0.139	1.036	0.831	1.039	0.833
PEV2	0.152	0.938	0.767	0.944	0.771
PEV3	0.099	0.908	0.744	0.914	0.753
PEV4	0.145	1.042	0.868	1.048	0.871
PEV5	0.098	0.938	0.768	0.941	0.776
PUV1	0.067	0.975	0.768	0.982	0.777
PUV2	0.075	1.009	0.822	1.017	0.827
PUV3	0.108	0.999	0.826	1.007	0.827
PUV4	0.104	0.891	**0.734**	0.895	0.732
PUV5	0.069	1.011	0.809	1.022	0.823

According to the PLS prediction algorithm, Table 11 shows that, except for items CPI2 and PUV4, the PLS model's prediction errors are smaller than those of the LM model for all other items. Therefore, this study concludes that the proposed model possesses strong predictive power.

Assessment of the Mediating Effect of Perceived Value

This study employed the bootstrapping method within the partial least squares structural equation modelling framework to assess the mediating role of perceived value in the relationship between e-commerce live streamer popularity and customer purchase intention. Following the classification by Zhao, Lynch, and Chen (2010), when both the indirect and direct effects are significant and point in the same direction, it constitutes complementary mediation. As shown in Table 12 below, the point estimates for the indirect effects of the two perceived value mediation paths are both positive. Most crucially, the lower and upper bounds of the 95% bias-corrected confidence intervals for all paths are greater than 0 and do not include 0.

Table 12: Assessment of Mediating Effect Of Perceived Value

Indirect Path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	P values	Type of mediation	Hypothesis
PO->PUV->CPI	0.129	0.130	0.029	0.000	Complementary Partial Mediation	H3
PO->PEV->CPI	0.119	0.121	0.026	0.000	Complementary Partial Mediation	H5

This indicates that both perceived utilitarian value and perceived entertainment value function as complementary partial mediators in the effect of e-commerce live streamer popularity on customer purchase intention. This means that e-commerce live streamer characteristics directly affect customer purchase intention and indirectly enhance customers' perceived value. Both the direct and indirect effects are positive, jointly contributing to increased purchase intention. This complementary relationship illustrates that a live streamer's popularity promotes purchases by shaping customer value perceptions, which constitutes a significant component, though not the entirety, of its influence mechanism.

Research Limitation and Future Direction

Future research should further expand the theoretical and contextual boundaries of e-commerce live streaming by incorporating additional psychological and behavioural mechanisms that may influence customer decision-making. While this study focused on dual perceived value as a mediating variable, future studies could examine other potential mediators, including trust, perceived authenticity, emotional attachment, customer engagement, and parasocial interaction, to provide a more comprehensive understanding of customer responses in live-streaming environments. Such extensions would enrich the explanatory capacity of Stimulus-Organism-Response theory and related behavioural frameworks in digital commerce settings. In addition, future scholars are encouraged to conduct comparative studies across different provinces, countries, and cultural contexts to evaluate the stability and universality of the proposed relationships. Customer perceptions and reactions toward live streamers may differ significantly according to cultural norms, digital maturity, and consumption patterns. Cross-cultural investigations would therefore strengthen the external validity and international applicability of the findings. Methodologically, future studies may employ longitudinal designs, experimental approaches, or mixed-method strategies to better capture causal relationships and evolving customer behaviours over time. As e-commerce live streaming continues to develop rapidly, longitudinal investigations could provide valuable insights into how streamer popularity, customer perceptions, and purchase intentions change across different stages of platform and market development.

Theoretical and Practical Contributions

At the theoretical level, by introducing dual perceived value as a mediating variable, this study elucidates the pathway through which live streamer popularity influences purchase intention via value perceptions. This deepens the understanding of the intrinsic mechanisms of Customer decision-making in e-commerce live streaming and validates and extends the explanatory power of the Stimulus-Organism-Response theory, Stimulus-Response theory, and Perceived Value theory in this context. At the practical level, the findings provide

insights for the refined operation of e-commerce live streaming stakeholders. Live streamers and their teams need to strike a balance between professional and entertaining content, converting traffic influence into tangible customer value. Platforms and agencies should, in evaluating and cultivating live streamers, look beyond singular sales metrics and focus on their value-creation capabilities. Based on promotional objectives, such as prioritizing utilitarian value for inventory clearance and emphasizing entertainment value for brand building, brands can differentially select cooperating e-commerce live streamers to maximise marketing utility.

Limitations and Future Research

This study has certain limitations. First, the sample is limited to Shandong Province, and the generalizability of the conclusions requires further testing across different regional and cultural contexts. Second, the cross-sectional data makes it difficult to strictly infer causality; future research could employ experimental methods or longitudinal studies for verification. Furthermore, future studies could deconstruct popularity into dimensions such as social popularity and professional popularity, and introduce customer characteristics or product types as moderating variables to construct a more refined and context-adaptable theoretical model.

Conclusions

Grounded in the Stimulus-Organism-Response theory, the Stimulus-Response theory, and the Perceived Value theory, this study systematically examined the mechanism through which e-commerce live streamer popularity affects customer purchase intention, using data from 443 valid questionnaires. The findings reveal that live streamer popularity not only directly affects purchase intention but also indirectly enhances customers' perceived utilitarian and entertainment value. Both perceived utilitarian value and perceived entertainment value significantly drive purchase intention and partially mediate the relationship between popularity and purchase intention. This suggests that the influence of highly popular live streamers stems, on the one hand, from the direct effects of their credibility and social recognition, and, on the other hand, from empowering customers' dual value perceptions of rational calculation and emotional experience. Between the two pathways, the mediating effect of utilitarian value is slightly stronger, underscoring the fundamental role of rational evaluation in live-streaming purchase decisions.

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