

Application and Effect Evaluation of Visual Marketing in Live E-commerce

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Abstract

Purpose – This study investigates the influence of visual marketing strategies employed during live streaming on consumer impulse buying behavior.

Design/Methodology/Approach – Utilizing the Stimulus-Organism-Response (S-O-R) framework, it explores how different visual marketing tactics like color intensity, layout dynamics, and influencer interactions amplify consumer emotional arousal and affect their cognitive assessments and purchasing decisions.

Findings – The research, based on a survey conducted on Douyin (TikTok), analyzes how emotional arousal mediates the relationship between visual marketing and impulse buying while also examining the moderating role of cognitive assessment.

Research Implications – Results indicate that effective visual marketing can significantly enhance consumer emotional responses, which in turn, influence impulse purchasing behaviors, highlighting the importance of strategic visual marketing to capitalize on the interactive potentials of live streaming.

Keywords: Visual Marketing, Live Streaming, Impulse Buying, Consumer Behavior, Stimulus-Organism-Response (S-O-R) Model
JEL Classifications: M31, L82

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I . Introduction

Live streaming has emerged as a significant force in digital marketing, especially within e-commerce platforms. With advancements in internet bandwidth and technology, platforms like Douyin (TikTok), Twitch, and YouTube have soared in popularity, captivating millions of daily users. These platforms enable brands to connect with consumers in real time, offering a unique space for visual marketing. Visual marketing in live streaming includes high-quality visuals, engaging product demonstrations, and attractive graphic representations, all crucial for capturing viewer attention and enhancing the shopping experience. The effectiveness of visual stimuli, combined with real-time interaction, creates a potent environment for influencing consumer behaviors, notably impulse buying.

Impulse buying is characterized by a spontaneous and immediate purchase decision, marked by a sudden and powerful urge to buy something instantly. The context of live streaming significantly heightens impulse buying due to its real-time nature of consumer engagement. Strategies such as limited-time offers, live product demonstrations, and immediate calls to action are expertly employed to trigger emotional responses from viewers, thus increasing the likelihood of impulse purchases. The immediate feedback loop provided by live streaming, where viewers can see products, ask questions, and make purchases instantaneously, amplifies the impulsiveness of shopping decisions.

The study explores the specific impact of visual marketing strategies employed during live streaming sessions on consumer impulse buying behavior. By examining how different visual marketing tactics affect impulse purchasing, the research provides insights into consumer behavior that help marketers optimize their strategies for the live streaming environment. This is particularly relevant in today's market, where digital shopping experiences are becoming more interactive and immersive. Given the rapid growth of e-commerce and the increasing sophistication of consumer expectations, the research addresses the growing need for strategies that effectively leverage the unique dynamics of live streaming to boost sales and consumer engagement. This exploration aligns with current trends and underscores the importance of adapting marketing strategies to the evolving digital landscape.

II . Literature Review

Previous research has highlighted the profound impact of visual marketing on consumer behavior, particularly within digital platforms. Visual marketing leverages elements such as imagery, colors, and videos to capture attention and influence consumer perceptions and decisions (Cheng, 2020). These visual elements are especially potent in live streaming, where real-time interaction and visually rich content create an engaging shopping environment that can significantly alter consumer behavior.

The Stimulus-Organism-Response (S-O-R) model, a cornerstone in environmental psychology, has been adapted to study consumer behavior in e-commerce settings. This model suggests that environmental stimuli (S) affect the internal state of the organism (O), which in turn influences the response (R), or behavior, of the individual. In the context of e-commerce, stimuli are often visual and auditory cues provided during live streaming sessions, which impact consumer emotions and cognitions, leading to various forms of consumer responses including impulse buying (Qi, 2023).

Research has extensively explored how visual cues in live streaming influence consumer behavior. Live streaming platforms provide a unique set of visual and interactive cues that are not present in traditional online shopping environments. For example, the immediacy and visual appeal of products showcased in real time can trigger emotional responses that accelerate purchasing decisions. Studies by Li, Wang, and Cao (2022) demonstrate that the social presence and real-time engagement found in live streaming can enhance the effects of visual marketing, leading to increased impulse buying. Furthermore, the dynamic interaction between streamers and the audience creates a persuasive environment where visual cues are more influential due to the heightened emotional engagement of consumers.

These findings underscore the importance of understanding and leveraging visual marketing strategies in live streaming to effectively influence consumer purchasing behaviors, aligning with the theoretical underpinnings provided by the S-O-R

model. This body of research provides a critical foundation for developing marketing strategies that capitalize on the unique characteristics of live streaming to enhance consumer engagement and drive sales.

III .Hypotheses Development

1.Theoretical Model

Enhanced S-O-R Model: Mediating and Moderating Effects in Live Streaming Visual Marketing

The advanced theoretical model integrates the classic Stimulus-Organism-Response paradigm with computational analyses to elucidate the pathways through which visual marketing elements affect consumer purchasing behavior during live streaming sessions. The model delineates the mediating role of emotional arousal and the moderating influence of cognitive assessment within this dynamic.

2.Mediation by Emotional Arousal

In this model, emotional arousal is posited as a mediator that translates the impact of visual marketing stimuli into cognitive changes and subsequent buying actions. Visual stimuli, such as dynamic layouts, vibrant color schemes, and interactive influencer behaviors, are processed using computational algorithms that quantify their intensity and effects on viewers. The resultant emotional arousal is hypothesized to influence cognitive assessments of products, which in turn drives impulse buying decisions.

Mediating Effect Formula:

$$\text{CognitiveAssessment} = \gamma + \delta * \text{EmotionalArousal} + \varepsilon$$

Where:

γ (gamma) is the intercept, representing the baseline level of cognitive assessment.

δ (delta) measures the effect of Emotional Arousal on Cognitive Assessment.

ε (epsilon) is the error term, accounting for variability not explained by the model.

Here, EmotionalArousal acts as a mediator affecting both the direct path to ImpulseBuying and through CognitiveAssessment.

3.Moderation by Cognitive Assessment

Cognitive assessment is further theorized to moderate the relationship between emotional arousal and impulse buying, suggesting that the extent of cognitive processing can influence how emotional responses translate into purchasing decisions. This moderating effect is analyzed through interaction terms in regression models, providing insights into how cognitive clarity can amplify or mitigate the impacts of emotional stimuli on purchasing behaviors.

Moderating Effect Formula:

$$\text{ImpulseBuying} = \beta_0 + \beta_1 * \text{EmotionalArousal} + \beta_2 * \text{CognitiveAssessment} + \beta_3 * (\text{EmotionalArousal} * \text{CognitiveAssessment}) + \varepsilon$$

Where:

β_0 (beta zero) is the intercept.

β_1 (beta one) quantifies the effect of Emotional Arousal on Impulse Buying.

β_2 (beta two) quantifies the effect of Cognitive Assessment on Impulse Buying.

β_3 (beta three) measures the interaction effect, indicating how Cognitive Assessment moderates the impact of Emotional Arousal.

ε (epsilon) is the error term.

This formula captures the interaction between Emotional Arousal and Cognitive Assessment, highlighting how cognitive clarity affects the translation of emotional stimuli into purchasing decisions.

4. Development of Hypotheses

This study posits a series of hypotheses aimed at exploring the dynamics of consumer responses to visual marketing in live streaming contexts. These hypotheses are grounded in the Stimulus-Organism-Response (S-O-R) model and tailored to address specific interactions between visual stimuli, emotional arousal, cognitive assessment, and consumer behavior.

Hypothesis 1 (H1) concerns the role of visual marketing elements—such as color intensity, layout dynamics, and influencer interactions—in enhancing consumer emotional arousal. It is proposed that these elements significantly captivate attention and stimulate emotional responses, which are crucial for maintaining viewer engagement and enhancing the perceptual experience.

Hypothesis 2 (H2) explores the impact of this enhanced emotional arousal on consumers' cognitive assessment of the products being presented. The hypothesis asserts that a heightened emotional state can positively influence the cognitive evaluations of products, as emotionally engaged consumers are more likely to absorb and react positively to product details.

Hypothesis 3 (H3) extends this relationship to the realm of impulse buying behavior, suggesting that positive cognitive assessments directly increase the likelihood of impulse purchases during live streams. This relationship underscores the importance of cognitive factors in the purchasing process, particularly under conditions that favor quick decision-making typical of live streaming environments.

Hypothesis 4 (H4) examines the mediating role of emotional arousal between the initial visual stimuli and the ultimate buying behavior. This hypothesis posits that emotional arousal serves as a crucial mediator, transmitting the influence of visual marketing on impulse buying both directly and through its impact on cognitive assessment.

Hypothesis 5 (H5) introduces a moderating variable, cognitive assessment, into the model. It proposes that the degree to which emotional arousal affects impulse buying is contingent upon the level of cognitive clarity consumers possess about the product. This suggests that consumers with a higher cognitive understanding of a product are more likely to convert their emotional responses into purchase actions effectively.

Together, these hypotheses aim to delineate the pathways through which visual marketing strategies deployed during live streaming can influence consumer behavior. By testing these hypotheses, the study seeks to provide actionable insights into how marketers can optimize visual cues to enhance consumer engagement and drive sales effectively in live streaming settings. The outcomes of these hypotheses could offer substantial contributions to both academic research and practical applications in digital marketing strategies tailored for live streaming platforms.

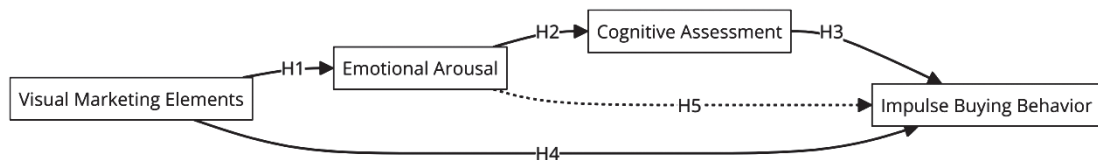


Figure 1. Research Model

IV . METHODOLOGY

1.Measurement Development

The survey was structured into two sections. The first section captured demographic information from the participants, while the second section consisted of the main survey questions, which were designed to investigate the impact of visual marketing on impulse buying during live streaming sessions on Douyin. The survey incorporated several variables informed by well-established scales from previous research to ensure the validity of the constructs measured. Items were formatted using a five-point Likert scale, ranging from one (strongly disagree) to five (strongly agree), to gauge the intensity of respondents' agreement or disagreement with the statements. To maintain the survey's relevance across language barriers, the questionnaire, originally developed in Chinese, underwent a meticulous back-translation process to ensure its accuracy and applicability in English contexts. A pilot test with a subset of participants ensured that the survey items were clear and unambiguous.

2.Data Collection

Data was collected via a professional online survey platform suitable for the target demographic in China (www.wjx.cn). The target respondents were active consumers who had previously engaged with live streaming platforms and participated in e-commerce activities. To ensure that the responses were from the intended audience, a screening question was included at the beginning of the survey: "Have you ever made a purchase during a live streaming session?" Participants who responded negatively were automatically excluded from further sections of the survey. The survey aimed to motivate participation by offering a small monetary incentive, randomly awarding a red envelope worth between 1-5 RMB upon completion of the survey. Over the data collection period, a robust total of 1,528 responses were gathered. The integrity of the responses was safeguarded by excluding incomplete surveys or those that displayed uniform answers across all questions. Additionally, IP address checks were conducted to prevent multiple submissions from the same respondent.

3.Data Analysis

This study employed IBM SPSS 20.0 for initial statistical analysis to process and analyze the survey data collected from 1,528 participants. Statistical procedures included frequency analysis, descriptive statistics, and inferential statistics to determine the relationships between visual marketing elements and impulse buying behaviors during live streaming sessions on Douyin.

3.1Descriptive Statistics of Respondents' Characteristics

Below is the breakdown of the demographic characteristics of the survey respondents, formatted similarly to your example for clarity:

Table 1. Descriptive Statistics of Respondents' Characteristics

Demographic	Category	Samples (%)
Gender	Male	727 (47.58%)
	Female	801 (52.42%)
Age	18-24	432 (28.27%)
	25-34	355 (23.23%)
	35-44	328 (21.47%)
	45-54	336 (21.99%)
	55-64	35 (2.29%)
	65 and above	42 (2.75%)
Occupation	Student	275 (18%)
	Professional	331 (21.66%)
	Technician	425 (27.81%)
	Other	497 (32.53%)
Education	High School or less	243 (15.9%)
	Some College	351 (22.97%)
	Bachelor's Degree	453 (29.65%)
	Graduate Degree	481 (31.48%)
Online Shopping Frequency	Less than once a month	284 (18.59%)
	1-3 times a month	692 (45.29%)
	More than 3 times a month	552 (36.13%)
Monthly Income	Less than 3000 RMB	147 (9.62%)
	3000-5000 RMB	356 (23.3%)
	5000-8000 RMB	427 (27.95%)
	8000-12000 RMB	385 (25.2%)
	More than 12000 RMB	213 (13.94%)

4.Results

The study conducted Pearson correlation analysis to verify the hypotheses regarding the impact of visual marketing elements in live streaming on consumer impulse buying behavior. The analysis included various visual elements such as colors, layout, and interactions with influencers.

Hypothesis H1 Analysis:

Table 2. Correlation analysis between visual marketing and consumer psychological process

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	1												
2	0.688**	1											
3	0.676**	0.654**	1										
4	0.674**	0.623**	0.641**	1									
5	0.679**	0.634**	0.623**	0.614**	1								
6	0.676**	0.641**	0.650**	0.646**	0.624**	1							
7	0.684**	0.661**	0.656**	0.639**	0.664**	0.659**	1						
8	0.509**	0.483**	0.493**	0.466**	0.478**	0.481**	0.493**	1					
9	0.438**	0.430**	0.437**	0.422**	0.411**	0.414**	0.426**	0.685**	1				
10	0.452**	0.451**	0.435**	0.433**	0.421**	0.429**	0.443**	0.700**	0.679**	1			
11	0.454**	0.452**	0.433**	0.430**	0.421**	0.421**	0.448**	0.695**	0.656**	0.640**	1		
12	0.428**	0.417**	0.421**	0.414**	0.417**	0.397**	0.455**	0.687**	0.633**	0.654**	0.656**	1	
13	0.473**	0.457**	0.430**	0.438**	0.443**	0.435**	0.448**	0.694**	0.639**	0.655**	0.650**	0.634**	1

* p<0.05 ** p<0.01

Hypothesis H1 explored the impact of visual marketing elements—color intensity, layout dynamics, and influencer interactions—on consumer emotional arousal during live streaming on Douyin. The analysis affirmed that these visual elements significantly enhance emotional arousal.

Supporting data from Pearson correlation analysis indicated strong positive correlations between these elements and increased emotional arousal. Notably:

Diversity in product offerings and the comprehensiveness of product information exhibited a correlation coefficient of 0.688 ($p<0.01$).

Viewer interest, stimulated by live stream advertisements, correlated positively with both product diversity and information richness.

Hypothesis H1 suggested that visual marketing elements like color, layout, and influencer interaction positively enhance consumer emotional arousal. The correlation analysis supported this hypothesis, showing significant positive correlations between these elements and consumer emotional arousal.

Hypothesis H2 Analysis:

Table 3. Correlation analysis of consumer psychological process and cognitive assessment

	14	15	16	8	9	10	11	12	13
14	1								
15	0.715**	1							
16	0.704**	0.669**	1						
8	0.518**	0.492**	0.475**	1					
9	0.487**	0.477**	0.460**	0.685**	1				
10	0.494**	0.468**	0.438**	0.700**	0.679**	1			
11	0.471**	0.467**	0.429**	0.695**	0.656**	0.640**	1		
12	0.490**	0.475**	0.452**	0.687**	0.633**	0.654**	0.656**	1	
13	0.486**	0.467**	0.435**	0.694**	0.639**	0.655**	0.650**	0.634**	1

* p<0.05 ** p<0.01

Hypothesis H2 proposed that emotional arousal positively influences consumers' cognitive assessment of products during live streaming sessions. The empirical analysis drew on Pearson correlation metrics to assess the relationships between emotional responses elicited by visual stimuli and the cognitive evaluations made by viewers.

The findings, detailed in Table 3, support Hypothesis H2 by demonstrating significant positive correlations between measures of emotional arousal and cognitive assessments. Key results include:

High correlation coefficients between indicators of emotional arousal and positive cognitive assessments. For instance, the correlation between satisfaction derived from visual stimuli (Indicator 8) and comprehensive product information understanding (Indicator 15) was 0.715 (p<0.01).

Similarly, the perception of product features through live streaming demonstrations (Indicator 16) showed a robust correlation of 0.704 with the overall satisfaction index (Indicator 8), reinforcing the link between detailed product demonstrations and enhanced cognitive assessments.

Hypothesis H2 posited that consumer emotional arousal would positively affect their cognitive assessment of live streaming products. The results confirmed this relationship, indicating that heightened emotional arousal leads to a more favorable cognitive evaluation of the products showcased during live streaming sessions .

Hypothesis H3 Analysis:

Table 4. Correlation analysis between cognitive assessment and impulse purchase intention

	14	15	16	17	18	19
14	1					
15	0.715**	1				
16	0.704**	0.669**	1			
17	0.464**	0.450**	0.435**	1		
18	0.414**	0.412**	0.404**	0.694**	1	
19	0.446**	0.407**	0.401**	0.690**	0.680**	1

* p<0.05 ** p<0.01

Hypothesis H3 examined the influence of cognitive assessment on impulse buying behavior, positing that a detailed and positive cognitive evaluation of products during live streaming would significantly enhance impulse buying tendencies. The Pearson correlation analysis conducted to test this hypothesis utilized data presented in Table 4, which demonstrated significant positive correlations between cognitive assessments and impulse buying intentions.

Key observations from the analysis include:

A robust correlation between the thorough understanding of product information (Indicator 14) and the immediate desire to own the product upon viewing (Indicator 17), with a coefficient of 0.464 ($p < 0.01$).

The clarity with which products were presented and understood (Indicator 15) also showed a strong positive correlation with the stimulation of purchase desire (Indicator 18), evidenced by a correlation coefficient of 0.412 ($p < 0.01$).

Additionally, the comprehensive demonstration of product features (Indicator 16) correlated positively with spontaneous purchasing inclinations, even when those purchases were not pre-planned (Indicator 19), with a coefficient of 0.401 ($p < 0.01$).

The third hypothesis, H3, stated that the consumer's cognitive assessment would positively impact their impulse buying behavior. This hypothesis was also supported, as the analysis revealed significant positive effects of cognitive assessment on impulse buying intentions. These findings underscore the importance of providing detailed product information and engaging presentations to enhance consumer purchase intentions .

Hypothesis H4 Analysis:

Table 5. Analysis of the total mediating effect of consumer emotion stimulation

Results of mediation analysis (n=1528)															
	Impulse Buying Intention					Consumer Psychological Process					Impulse Buying Intention				
	B	Standard Error	t	p	β	B	Standard Error	t	p	β	B	Standard Error	t	p	β
Constant	1.753**	0.117	14.975	0.000	-	1.689**	0.103	16.320	0.000	-	1.068**	0.118	9.012	0.000	-
Visual Marketing	0.616**	0.023	26.553	0.000	0.562	0.636**	0.020	31.020	0.000	0.622	0.358**	0.028	12.936	0.000	0.327
Consumer Psychological Process											0.406**	0.027	15.010	0.000	0.379
R2			0.316					0.387					0.404		
Adjusted R²			0.316					0.386					0.403		
F Value	F (1,1526)=705.038,p=0.000					F (1,1526)=962.227,p=0.000					F (2,1525)=516.982,p=0.000				
* p<0.05 ** p<0.01															

Hypothesis H4 was premised on the mediating role of consumer emotional arousal in the transmission of the effects of visual marketing elements on impulse buying behavior. The mediation analysis, conducted with a sample size of 1528 participants, provided insights into the complex dynamics at play.

The analysis confirmed that emotional arousal partially mediates the relationship between visual marketing elements and impulse buying. The findings indicated that visual marketing, through the mechanism of emotional arousal, has a significant positive influence on impulse buying intentions. Specifically, the standardized regression coefficient for visual marketing was substantial ($B=0.616$, $p < 0.01$), reinforcing the assumption that enhancements in visual marketing are correlated with

increases in impulse buying intentions.

According to the analysis results of intermediary effects shown in the above table, the regression equations of the following three models can be obtained:

1. Impulse purchase intention model:

$$\text{Impulse purchase intention} = 1.753 + 0.616 * \text{Visual marketing}$$

This model shows that visual marketing elements have a significant positive impact on impulse purchase intention, where the regression coefficient 0.616 indicates that there is a positive correlation between the increase of visual marketing and the increase of impulse purchase intention.

2. Consumer psychological process model:

$$\text{Consumer psychological process} = 1.689 + 0.636 * \text{Visual marketing}$$

In this model, visual marketing elements also have a significant positive impact on consumer psychological process, and the regression coefficient 0.636 emphasizes the role of visual marketing in shaping consumer psychological process.

3. Complete model of impulse purchase intention (including mediating variables) :

$$\text{Impulse purchase intention} = 1.068 + 0.358 * \text{Visual marketing} + 0.406 * \text{Consumer psychological process}$$

This model considers the combined influence of visual marketing elements and consumer psychological process on impulse purchase intention. Among them, the regression coefficient of visual marketing is 0.358, indicating that visual marketing elements still have a significant impact on impulse purchase intention even after controlling for consumer psychological processes. At the same time, the regression coefficient of consumer psychological process is 0.406, which confirms the mediating role of consumer psychological process between visual marketing elements and impulse purchase intention.

H4 hypothesized that consumer emotional arousal mediates the relationship between visual marketing elements and impulse buying behavior. The mediation analysis indicated that emotional arousal does play a partial mediating role, suggesting that enhancing visual marketing elements can effectively boost consumer emotional responses, which in turn can lead to increased impulse buying .

Hypothesis H5 Analysis:

Hypothesis H5 posited that cognitive assessment would moderate the effect of emotional arousal on impulse buying behavior. This hypothesis was examined through moderation analyses, which included variables representing the clarity of product information and its presentation during Douyin live streams.

Tables 6, 7, and 8 display the results of these moderation analyses, with separate models reflecting the nuanced roles that different aspects of cognitive assessment play as moderating variables. In each table, 'B' denotes the unstandardized regression coefficients, 'Standard Error' the associated standard errors, 't' the t-statistics, 'p' the p-values indicating the significance levels, and 'β' the standardized regression coefficients. The constants listed across the models represent the baseline values of the dependent variable, impulse buying intention, when predictors are at zero.

Each model considered the interaction between emotional arousal (as measured by the consumer psychological process) and cognitive assessment (as indicated by the thoroughness of product information, clarity of product understanding, and product demonstration comprehension).

When "I think the product information displayed in Tiktok live is exhaustive." As a regulating variable

Table 6. Analysis of the moderating effects of cognitive assessment1

Results of mediation analysis (n=1528)															
	Module 1					Module 2					Module 3				
	B	Standard Error	t	p	β	B	Standard Error	t	p	β	B	Standard Error	t	p	β
Constant	4.763	0.029	165.422	0.000**	-	4.763	0.028	170.308	0.000**	-	4.683	0.032	147.640	0.000**	-
Consumer psychological process	0.623	0.022	27.954	0.000**	0.582	0.476	0.027	17.906	0.000**	0.444	0.500	0.027	18.680	0.000**	0.466
I think the product information displayed in Tiktok live broadcast is exhaustive						0.217	0.023	9.617	0.000**	0.238	0.235	0.023	10.376	0.000**	0.258
Consumer psychological process* I think the product information displayed in Tiktok live broadcast is exhaustive											0.070	0.014	5.174	0.000**	0.110
R 2			0.339					0.376					0.387		
Adjusted R²			0.338					0.376					0.386		
F Value			F (1,1526)=781.453,p=0.000					F (2,1525)=460.390,p=0.000					F (3,1524)=321.037,p=0.000		
△ R 2			0.339					0.038					0.011		
△ F Value			F (1,1526)=781.453,p=0.000					F (1,1525)=92.481,p=0.000					F (1,1524)=26.772,p=0.000		
Dependent variable: impulse purchase intention															
* p<0.05 ** p<0.01															

The model revealed that the thoroughness of product information significantly moderated the relationship between emotional arousal and impulse buying intention. The interaction term between emotional arousal and the thoroughness of product information was significant, indicating a stronger impact on impulse buying when consumers perceived product information as comprehensive.

When "I can clearly understand the features and advantages of the product through Tiktok live streaming." As a regulating variable

Table 7. Analysis of the moderating effects of cognitive assessment2

Results of mediation analysis (n=1528)															
	Module 1					Module 2					Module 3				
	B	Standard Error	t	p	β	B	Standard Error	t	p	β	B	Standard Error	t	p	β
Constant	4.763	0.029	165.422	0.000**	-	4.763	0.028	169.601	0.000**	-	4.711	0.032	148.801	0.000**	-
Consumer psychological process	0.623	0.022	27.954	0.000**	0.582	0.493	0.026	18.791	0.000**	0.460	0.505	0.026	19.154	0.000**	0.472
I can clearly understand the features and advantages of the product through Tiktok live broadcast.						0.190	0.021	8.893	0.000**	0.218	0.203	0.022	9.379	0.000**	0.232
Consumer psychological process * I can clearly understand the features and advantages of products through Tiktok live broadcast.											0.045	0.013	3.457	0.001**	0.074
R 2			0.339					0.371					0.376		
Adjusted R²			0.338					0.370					0.375		
F Value			F (1,1526)=781.453,p=0.000					F (2,1525)=450.261,p=0.000					F (3,1524)=306.311,p=0.000		
△ R 2			0.339					0.033					0.005		
△ F Value			F (1,1526)=781.453,p=0.000					F (1,1525)=79.083,p=0.000					F (1,1524)=11.948,p=0.001		
Dependent variable: impulse purchase intention															
* p<0.05 ** p<0.01															

The clarity of consumers' understanding of product features and advantages also moderated the effect of emotional arousal on impulse buying. The interaction term was significant, underscoring that clear and understandable product presentations strengthen the impact of emotional arousal on the likelihood of making an impulse purchase.

When "the product demo provided by Tiktok Live gave me a full understanding of the performance of the product." As a regulating variable

Table 8. Analysis of the moderating effects of cognitive assessment³

Results of mediation analysis (n=1528)															
	Module 1					Module 2					Module 3				
	B	Standard Error	t	p	β	B	Standard Error	t	p	β	B	Standard Error	t	p	β
Constant	4.763	0.029	165.422	0.000**	-	4.763	0.028	169.805	0.000**	-	4.698	0.031	150.689	0.000**	-
Consumer psychological process	0.623	0.022	27.954	0.000**	0.582	0.500	0.026	19.554	0.000**	0.467	0.516	0.026	20.126	0.000**	0.482
The product demonstration provided by Tiktok Live broadcast gave me a full understanding of the performance of the product.						0.196	0.021	9.107	0.000**	0.218	0.211	0.022	9.757	0.000**	0.234
Consumer psychological process * The product demonstration provided by Tiktok Live has given me a full understanding of the performance of the product.											0.062	0.013	4.635	0.000**	0.097
R 2			0.339					0.373					0.381		
Adjusted R²			0.338					0.372					0.380		
F Value			F (1,1526)=781.453,p=0.000					F (2,1525)=453.178,p=0.000					F (3,1524)=313.338,p=0.000		
△ R 2			0.339					0.034					0.009		
△ F Value			F (1,1526)=781.453,p=0.000					F (1,1525)=82.941,p=0.000					F (1,1524)=21.485,p=0.000		
Dependent variable: impulse purchase intention															
* p<0.05 ** p<0.01															

Finally, the extent to which product demonstrations facilitated a full understanding of product performance significantly moderated the influence of emotional arousal on impulse buying. Again, the interaction term's significance suggested that when demonstrations effectively convey product attributes, the emotional arousal's effect on impulse buying is amplified.

The results across these tables consistently supported Hypothesis H5, confirming the moderating role of cognitive assessment in the pathway from emotional arousal to impulse buying behavior. The findings underscore the importance of delivering clear and comprehensive product information through live streaming to enhance consumer purchase intentions.

V . Discussion

This study delves into the intricate relationship between visual marketing elements and consumer impulse buying behavior within the context of e-commerce live streaming. Drawing upon the Stimulus-Organism-Response (S-O-R) model, our research provides a nuanced understanding of the psychological processes that underpin this dynamic interaction.

The mediating role of emotional arousal was substantiated, showcasing its critical position in the pathway from visual stimuli to consumer cognitive assessment, and ultimately, to impulse buying. The findings reveal that visual marketing elements such as layout, color, and influencer interaction, significantly bolster emotional arousal, which in turn, enhances the cognitive assessment of the products. This cognitive reassessment, influenced by heightened emotional arousal, manifests in an increased propensity for impulse buying. Such an effect emphasizes the need for marketers to design live streaming sessions that strategically deploy visual cues to cultivate an emotionally charged shopping environment.

Furthermore, the moderating effect of cognitive assessment was also confirmed, suggesting that when consumers have a clear and comprehensive understanding of the product, the influence of emotional arousal on impulse buying behavior is potentiated. This result points to the importance of providing detailed product demonstrations and information during live streams, which not only inform the consumer but also catalyze the emotional drive towards making a purchase.

The study's outcomes underscore the efficacy of visual marketing strategies in live streaming and the importance of crafting experiences that align with consumers' cognitive and emotional faculties. The implications for marketers in e-commerce platforms are clear: by harnessing the interplay of visual stimuli and consumer psychology, they can significantly influence buying behaviors.

While the results are compelling, limitations exist, such as the potential for self-selection bias and the specificity of the consumer sample to the Douyin platform. Future research could extend to cross-platform studies and explore additional variables that may influence impulse buying in live streaming contexts.

In conclusion, the research enriches the discourse on visual marketing in live streaming by evidencing the psychological undercurrents that drive consumer behavior. It lays a foundation for future explorations and practical applications in digital marketing strategies, tailored for the immediacy and interactivity that define live streaming commerce.

VI . Conclusion

The conclusion of the research encapsulates the profound influence of visual marketing in live e-commerce streaming on consumer impulse buying behavior. Utilizing a robust Stimulus-Organism-Response (S-O-R) framework, the study dissects the complex interplay between visual cues and the psychological processes that culminate in purchasing decisions.

Central to the study's findings is the pivotal role of emotional arousal as a mediator, which amplifies the impact of visual stimuli on consumers' cognitive assessments and, consequently, on their impulsive purchasing tendencies. The data indicates that dynamic and engaging visual marketing can successfully translate into heightened emotional responses, which in turn foster favorable cognitive evaluations and spur impulse buying.

Moreover, cognitive assessment's moderating role is equally significant, revealing that the clarity and comprehensiveness of product information can magnify the effects of emotional arousal, enhancing the likelihood of impulse purchases. This insight underscores the importance of live streams delivering detailed and transparent product demonstrations to potentiate consumers' emotional impulses towards making purchases.

The study's implications for e-commerce platforms are clear: leveraging the synergetic effects of visual stimuli and consumer psychology can dramatically sway buying behaviors. For digital marketers, the message is to strategize visual

marketing that taps into the immediacy and interactivity unique to live streaming, aligning with the consumers' cognitive processes and emotional states to drive sales.

Despite the compelling findings, the study acknowledges its limitations, including potential self-selection bias and the specific consumer demographics associated with the Douyin platform. Future research directions may include a broader cross-platform approach and the exploration of additional factors influencing impulse buying in the realm of live streaming.

In sum, this research contributes valuable insights into the strategic use of visual marketing within live e-commerce streaming, providing a framework for future academic and practical endeavors in the evolving landscape of digital consumerism. It underscores the burgeoning significance of crafting interactive, visually stimulating experiences that align with consumer psychology to foster impulsive buying in the digital era.

APPENDIX

Number	Items	Source
1	Douyin Live offers a wide variety of products	Kurniawan & Nugroho 2024
2	Comprehensive product information is provided during Douyin Live	Huo et al. 2023
3	Douyin Live advertisements have sparked my interest in the merchant and advertised products	Huang & Suo 2021
4	Discount promotions in Douyin Live easily stimulate my desire to buy	Liu 2023
5	I like the visual experience and design of Douyin Live	Huang & Suo 2021
6	The way products are displayed in Douyin Live is attractive	Huo et al. 2023
7	The interface design of the Douyin Live room has good visual effects	Liu 2023
8	The visual stimuli in Douyin Live make me feel satisfied	Huang & Suo 2021
9	The visual stimuli in Douyin Live make me feel happy	Liu 2023
10	The visual stimuli in Douyin Live give me a homely feeling	Refasa et al. 2023
11	The visual stimuli in Douyin Live make me feel excited	Kurniawan & Nugroho 2024
12	The visual stimuli in Douyin Live make me feel excited	Huo et al. 2023
13	The visual stimuli in Douyin Live make me feel excited	Widyastuti 2023
14	I think the product information displayed in Douyin Live is exhaustive	Yiqi Yu et al. 2022
15	I can clearly understand the features and advantages of products through Douyin Live	N. Zhang et al. 2023
16	The product demonstrations provided by Douyin Live gave me a full understanding of the product's performance	Xingyang Lv et al. 2022
17	As soon as I see items on the Douyin booth, I immediately want to own them	Huang & Suo 2021
18	When I see this product in the Douyin studio, it stimulates my desire to buy	Liu 2023
19	When I see certain items in the Douyin studio, I want to buy them, even if they are not in my buying plan	Refasa et al. 2023

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