Dual-Path Impulse buying in Tiktok E-Commerce-The Role of Logistics Commitment

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Abstract

Despite the prevalence of impulse buying in live-streaming e-commerce, the concurrent and interactive effects of emotional and cognitive pathways remain poorly understood. Furthermore, logistics is typically viewed as a post-purchase operational concern, neglecting its potential role as a pre-purchase psychological signal. This study addresses these gaps by proposing and testing an integrated dual-path model grounded in Dual-System Theory and the Stimulus-Organism-Response (S-O-R) framework. The model posits that impulse buying is driven by an emotional pathway (host characteristics → emotional arousal) and a cognitive pathway (product presentation → perceived value). Crucially, logistics service commitment is theorized as a contextual moderator that strengthens both pathways by mitigating perceived risk. A set of six hypotheses is developed and empirically tested via survey data from TikTok live-streaming consumers (N=327) using structural equation modeling. Results confirm the dual-path mechanism and reveal the significant amplifying role of logistics service commitment. This research contributes by integrating affective and cognitive systems within a unified framework and reconceptualizing logistics as a pre-purchase trust signal. Practical implications for platforms, streamers, and logistics providers are discussed.

Keywords: live-streaming e-commerce; impulse buying behaviour; dual-path mechanism; logistics service commitment; TikTok; S-O-R framework

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1. Introduction

In the landscape of digital retail evolution, live-streaming e-commerce (LSE) has emerged as one of the most transformative forces, fundamentally reshaping the interaction paradigm between consumers, products, sellers, and platforms. Unlike traditional e-commerce formats that rely on static imagery and asynchronous communication, LSE seamlessly integrates real-time video broadcasting, instantaneous social interaction, and embedded purchasing functionality into a single consumption scenario. Platforms driven by short-video algorithms, such as TikTok (and its domestic counterpart Douyin), enable consumers to observe dynamic product demonstrations, engage in two-way real-time dialogues with hosts, and finalize purchase decisions within extremely compressed time windows. This profound fusion of entertainment, socialization, and commerce has not only altered the retail structure but also deeply influenced the psychological decision-making processes of consumers.

From a psychological perspective, LSE constructs a high-frequency, multimodal information environment. During the viewing process, consumers are simultaneously exposed to diverse stimuli, including visual demonstrations, verbal persuasion from hosts, real-time comments from other viewers (social cues), and platform-generated time-limited offers. In such a highly stimulated and time-pressured environment, the decision-making window is drastically narrowed, requiring consumers to process and feedback information almost instantaneously. This environment significantly increases the cognitive load while intensely triggering affective engagement, thereby providing a fertile ground for "impulse buying.

Impulse buying is defined as a spontaneous, immediate, and unreflective purchase behavior triggered by external stimuli. Although existing studies have explored impulsive consumption in live-streaming contexts, the literature remains fragmented. Some scholars emphasize the dominance of emotional stimuli, while others maintain that cognitive evaluations, such as value perception, remain decisive even under pressure. This theoretical conflict suggests that single-path models can no longer adequately explain the complexity of LSE. Consumer behavior on TikTok is not a simple "irrational carnival" but rather a result of the concurrent interplay between affective arousal and cognitive evaluation. Therefore, grounded in Dual-System Theory and the S-O-R framework, this study proposes and validates an integrated dual-path model of emotional and cognitive mechanisms.

Furthermore, this study seeks to disrupt the "post-purchase" bias of logistics in impulse buying literature. Traditional research has often examined post-purchase satisfaction in e-commerce (Rashid & Rasheed, 2024). In TikTok live-rooms, hosts frequently utilize logistics service promises—such as "flash delivery" and "hassle-free returns"—as core selling points. At this juncture, logistics transcends its role as a mere fulfillment tool and transforms into a pre-purchase psychological signal, aimed at legitimizing impulsive decisions by mitigating perceived risk. By introducing Logistics Service Commitment (LSC) as a moderating variable, this research aims to reveal how it serves as a "psychological safety net" to amplify the driving effects of both affect and cognition. By integrating dual-path mechanisms and repositioning logistics cues, this study not only advances the theoretical boundaries of impulse buying but also provides a strategic blueprint for live-streaming platforms and logistics providers.

1.1 Theoretical and Practical Imperatives for an Integrated Model

The accelerated growth of TikTok's live-streaming e-commerce sector underscores the urgency of developing a more comprehensive understanding of consumer decision-making within this format. While its commercial success is evident, academic explanations of its underlying psychological mechanisms remain incomplete. Prior research, by isolating emotional triggers such as streamer charisma or cognitive assessments such as product information quality, offers only partial explanations of impulse buying behaviour. This fragmentation raises a critical question: in the high-velocity, socially immersive context of live-streaming commerce, do emotional arousal and cognitive evaluation operate as parallel and independent pathways, or do they interact dynamically to produce impulse purchases?

Furthermore, the operational context of live-streaming commerce necessitates a re-evaluation of traditional supply chain elements. Sellers and streamers increasingly integrate logistics-related promises—such as expedited delivery, free returns, and service guarantees—directly into their sales narratives. These commitments are not communicated as post-purchase considerations, but as integral components of the purchase decision itself. Intuitively, such logistics service commitments may function as decisional "safety nets" that reduce uncertainty and amplify both emotional and cognitive impulses. However, their role as pre-purchase moderators remains largely unexplored in the literature.

Therefore, to move beyond fragmented insights, this study proposes and empirically tests a dual-path moderated model of impulse buying in live-streaming commerce. Specifically, the study aims to: (1) simultaneously examine and compare the emotional pathway (host characteristics → emotional arousal → impulse buying) and the cognitive pathway (product presentation → perceived value → impulse buying); (2) theorize and validate logistics service commitment as a critical boundary condition that amplifies both

pathways by mitigating perceived risk; and (3) provide an integrated explanatory framework that offers more nuanced theoretical and practical insights than existing single-path approaches.

2. Theoretical Background

2.1 Dual-System Theory and Cognitive Resource Depletion in LSE

Dual-System Theory provides a core framework for understanding consumer decision-making in high-stimulus environments. The theory posits that human decisions are driven by two parallel systems: System 1 is a fast, automatic, and affect-driven intuitive system, while System 2 is a slow, deliberate, and logic-controlled rational system.

In the specific context of TikTok live-streaming, the environment is characterized by high-velocity information flow and multimodal stimuli. We argue that this environment leads to "Cognitive Resource Depletion" (认知资源损耗). When consumers are exposed to simultaneous visual demonstrations, host persuasion, and real-time social cues, their System 2 (rational processing) becomes overwhelmed. As cognitive resources are depleted, individuals struggle to perform extensive cost-benefit analyses, making them more susceptible to the intuitive impulses of System 1.

However, impulse buying in LSE is not a complete bypass of System 2. Even under high arousal, consumers perform a "rapid value audit"—a heuristic-based evaluation of whether a deal is worthwhile. Therefore, the dual-path mechanism proposed in this study suggests that while System 1 initiates the impulse through emotional arousal, a simplified version of System 2 processing provides the "cognitive green light" through perceived value. This nuanced interplay explains why both affective and cognitive pathways are essential for understanding the entirety of the impulsive decision window on TikTok.

2.2 Extended Application of the S-O-R Framework

The Stimulus-Organism-Response (S-O-R) framework is a cornerstone for explaining how environmental cues influence consumer behavior. In LSE, external stimuli (S) are multidimensional. This study selects "Host Characteristics" as the affective trigger and "Product Presentation" as the cognitive trigger. These cues act upon the consumer’s internal organism states (O)—namely, affective arousal and perceived value—ultimately leading to the behavioral response (R) of impulse buying. By incorporating Dual-System Theory, we can more precisely delineate the "organism" processing within the S-O-R framework, distinguishing the parallel logic of emotional reaction and rational assessment.

2.3 Signaling Theory: From Operational Efficiency to Psychological Contract

For a long time, logistics has been marginalized in impulse buying literature, viewed merely as an antecedent to satisfaction. This study adopts Signaling Theory to re-examine the role of logistics. The theory suggests that under information asymmetry, high-quality signals from the seller (such as explicit logistics promises) effectively alleviate the buyer's perceived risk. During the immediate decision phase of a live-stream, Logistics Service Commitment (LSC) is not just a contract about speed, but a psychological guarantee of "transactional security." By providing an anticipated safeguard, it reduces the expectation of post-purchase regret, thereby acting as a moderator and amplifier at the moment of decision.

2.4 Host Characteristics and Emotional Arousal

Within live-streaming commerce, the host represents one of the most influential social stimuli shaping consumers' psychological responses. Host characteristics—such as attractiveness, expertise, credibility, and interaction quality—play a central role in creating an engaging and emotionally charged consumption environment. Drawing on social presence theory, hosts enhance consumers' perception of interpersonal warmth and immediacy, thereby increasing emotional involvement during the live-streaming session (Hassanein & Head, 2007; Lu et al., 2016).

From an affective perspective, charismatic hosts often employ expressive language, vivid storytelling, humor, and real-time interaction to stimulate excitement and enjoyment. These behaviors heighten consumers' emotional arousal, defined as a state of physiological and psychological activation characterized by alertness, excitement, and enthusiasm (Mehrabian & Russell, 1974). Prior studies in both offline retail and online environments have consistently demonstrated that salesperson enthusiasm and interpersonal interaction significantly elevate consumers' emotional arousal (Donovan & Rossiter, 1982; Park & Lin, 2020).

In live-streaming commerce, this effect is further amplified by parasocial interaction. Consumers may perceive streamers as quasi-friends or opinion leaders, fostering emotional engagement (Horton & Wohl, 1956; Tukachinsky et al., 2020). Research in live-streaming commerce links parasocial interaction and cognitive-affective processes to impulse buying (Lo et al., 2022; Wongkitrungrueng & Assarut, 2020).

Accordingly, this study proposes:

H1: Host characteristics have a positive effect on consumers' emotional arousal in live-streaming commerce.

2.5 Emotional Arousal and Impulse Buying

Emotional arousal has long been identified as a core antecedent of impulse buying behavior. According to affective processing theory, heightened arousal reduces consumers' cognitive control and increases reliance on intuitive, emotion-driven decision-making (Kahneman, 2011). When individuals experience excitement or pleasure, they are more likely to act spontaneously and less likely to engage in extensive deliberation.

Within the S-O-R framework, emotional arousal represents a key organismic state translating environmental stimuli into behavioral responses. Arousal induced by retail and social stimuli can influence impulse buying (Beatty & Ferrell, 1998; Verhagen & van Dolen, 2011). In live-streaming commerce, scarcity promotions and anticipated emotions can influence impulse purchase decisions (Qu et al., 2023). Scarcity may also trigger fear of missing out (FOMO) and impulse buying (Zhang et al., 2022).

Moreover, emotional arousal in live-streaming contexts is often collective rather than individual. The visibility of other viewers' reactions and purchases creates emotional contagion, whereby excitement spreads rapidly among viewers (Hatfield et al., 1994). Such shared arousal can accelerate impulsive decisions by reinforcing perceived social norms and desirability.

Thus, it is hypothesized that:

H2: Emotional arousal positively influences consumers' impulse buying behavior in live-streaming commerce.

2.6 Product Presentation and Perceived Value

Product presentation quality constitutes a critical informational stimulus in live-streaming commerce. Unlike static online product displays, live streams allow for real-time demonstrations, detailed explanations, and immediate responses to consumer inquiries. These features enhance information richness and diagnosticity, enabling consumers to form more favorable value perceptions (Daft & Lengel, 1986; Jiang & Benbasat, 2007).

Perceived value refers to consumers' overall assessment of a product's utility based on a comparison between perceived benefits and perceived costs (Zeithaml, 1988). Prior research suggests that rich product presentations and information can enhance consumers' perceived value (Sweeney & Soutar, 2001; Zhang, 2023).

In live-streaming commerce, product presentation is often strategically designed to highlight functional benefits, usage scenarios, and price advantages. Streamers frequently compare products, demonstrate real-life applications, and emphasize limited-time

discounts, all of which contribute to enhanced value perceptions. These effects are particularly salient in high-involvement categories, where consumers rely heavily on informational cues despite time pressure.

Therefore, this study proposes:

H3: Product presentation positively influences consumers' perceived value in live-streaming commerce.

2.7 Perceived Value and Impulse Buying

Although impulse buying is often viewed as emotionally driven, cognitive evaluations such as perceived value remain influential even in spontaneous purchasing decisions. Dual-System Theory suggests that while affective processes may dominate under time pressure, cognitive assessments are not entirely suppressed (Evans, 2008). Consumers may rapidly evaluate whether a product represents "good value for money" before committing to an impulse purchase.

Empirical studies have demonstrated that higher perceived value significantly increases purchase likelihood and reduces purchase hesitation, even in impulsive contexts (Chen et al., 2016; Xiao & Nicholson, 2013). In live-streaming commerce, favorable value perceptions can justify impulsive actions by providing post-hoc rationalization for spontaneous purchases.

Moreover, perceived value interacts with emotional arousal by legitimizing affect-driven decisions. When consumers perceive a product as highly valuable, they are more willing to act on emotional impulses without experiencing regret or cognitive dissonance.

Accordingly:

H4: Perceived value positively influences consumers' impulse buying behavior in live-streaming commerce.

2.8 The Moderating Role of Logistics Service Commitment

Logistics service commitment refers to sellers' explicit assurances regarding delivery speed, return policies, refund guarantees, and service reliability communicated during the live-streaming session. Drawing on Signaling Theory, such commitments function as credible quality signals that reduce information asymmetry and perceived risk (Spence, 1973).

Perceived risk can inhibit online transactions (Featherman & Pavlou, 2003). Delivery time affects uncertainty and risk (Ma, 2017). Logistics assurances can reduce concerns about delivery and returns. In live-streaming

commerce, where decisions are made rapidly, such assurances may serve as a psychological safety net that enables consumers to act on emotional and cognitive impulses with greater confidence.

Specifically, strong logistics service commitment may amplify the emotional pathway by reducing anxiety associated with spontaneous decisions, thereby allowing emotional arousal to translate more effectively into impulse buying. Simultaneously, logistics assurances may strengthen the cognitive pathway by enhancing perceived value through reduced non-monetary costs and risk.

Thus, this study hypothesizes:

H5: Logistics service commitment positively moderates the relationship between emotional arousal and impulse buying, such that the relationship is stronger when logistics service commitment is high.

H6: Logistics service commitment positively moderates the relationship between perceived value and impulse buying, such that the relationship is stronger when logistics service commitment is high.

3. Hypotheses Development

Figure 1. Proposed Conceptual Model of Impulse Buying in TikTok Live-Streaming-E-Commerce

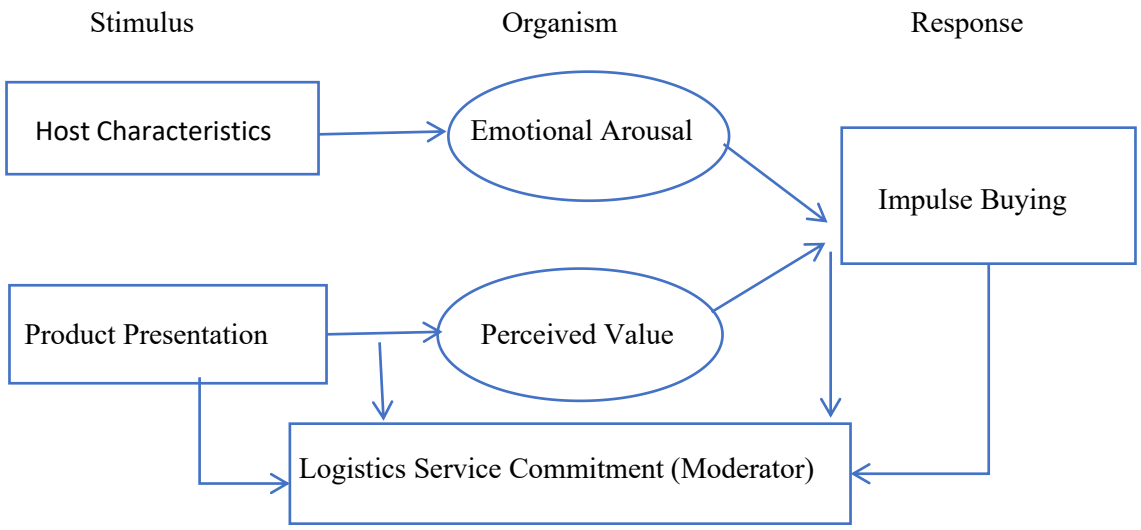


Figure 1 and Table 1 jointly summarize the hypothesized dual-path moderated framework.

Figure 1 illustrates the proposed conceptual model of impulse buying in TikTok live-streaming e-commerce. Drawing on the Stimulus–Organism–Response (S-O-R) framework and Dual-System Theory, the model depicts two parallel pathways—emotional and cognitive—through which environmental stimuli influence impulse buying behaviour. The moderating role of logistics service commitment is also incorporated to capture its risk-reduction function in real-time commerce contexts.

3.1 The Affective Pathway: Host Characteristics and Affective Arousal

In TikTok live-rooms, the host is the central carrier of social cues. The host's professionalism, attractiveness, and interaction quality directly determine the atmosphere of the live-stream. According to Social Presence Theory, high-interaction hosts enhance the consumer's psychological engagement, creating a sense of para-social interaction. This emotional bond induces a strong state of psychological activation, known as affective arousal, manifested as excitement and pleasure. Existing research confirms that host charisma can generate emotional contagion, placing viewers at a higher level of excitement. Accordingly, we propose:

H1: Host characteristics have a significant positive impact on consumers' affective arousal in LSE.

H2: Affective arousal positively influences impulse buying behavior.

3.2 The Cognitive Pathway: Product Presentation and Perceived Value

Unlike static images, product presentations in live-streams offer high information richness and diagnosticity. Through real-time operation, comparative testing, and detailed interpretation, hosts significantly reduce consumer uncertainty regarding product functions, thereby enhancing perceived value—the consumer's trade-off between benefits and costs. High-quality demonstrations make the logic of "value for money" intuitive, providing a cognitive basis for decisions made under time pressure. Even in impulse buying, consumers tend to seek a "rationalization" at the moment of decision, and high perceived value provides this psychological anchor. Accordingly, we propose:

H3: Product presentation has a significant positive impact on perceived value.

H4: Perceived value positively influences impulse buying behavior.

3.3Measurement Scales

To ensure the content validity of the research model, all measurement items used in this study were adapted from validated scales in the existing marketing and social commerce literature.

Host Characteristics (HC): Five items were adapted from Wongkitrungrueng and Assarut (2020) to measure expertise and attractiveness.

Product Presentation (PP): Four items were sourced from Zhang et al. (2020), focusing on information diagnosticity and visual clarity.

Organism States (EA & PV): Emotional Arousal (EA) was measured using four items from the PAD framework by Mehrabian and Russell (1974). Perceived Value (PV) was operationalized with four items adapted from Zeithaml (1988).

Logistics Service Commitment (LSC): Since LSC is a focal moderating variable, we adapted four items from service signaling literature, specifically focusing on the explicitness of delivery and return guarantees.

Impulse Buying (IB): The dependent variable was assessed using five items from Beatty and Ferrell (1998).

All items were measured on a 7-point Likert scale, ranging from "Strongly Disagree" (1) to "Strongly Agree" (7), to provide higher statistical sensitivity for the subsequent structural equation modeling.

3.4 The Moderating Role of Logistics Service Commitment (LSC)

Logistics service commitment includes explicit guarantees such as delivery timeliness and ease of returns. For the affective pathway, a high LSC acts as a "sedative," alleviating potential anxiety caused by emotional excitement, making consumers more confident in following their emotional intuition. For the cognitive pathway, LSC reduces non-monetary transaction costs, making the perceived value more attractive under "worry-free guarantees." When logistics signals are strong, the friction in converting affect and cognition into buying behavior is minimized.

Accordingly, we propose:

H5: LSC positively moderates the relationship between affective arousal and impulse buying.

H6: LSC positively moderates the relationship between perceived value and impulse buying.

Table 1. Summary of Hypotheses and Theoretical Foundations

Hypothesis	Path	Theoretical Foundation
H1	Host characteristics → Emotional arousal	Dual-System Theory; S-O-R framework
H2	Emotional arousal → Impulse buying behaviour	Impulse consumption theory
H3	Product presentation → Perceived value	Information processing theory; S-O-R framework

Hypothesis	Path	Theoretical Foundation
H4	Perceived value → Impulse buying behaviour	Perceived value theory
H5	Logistics service commitment × Emotional arousal → Impulse buying behaviour	Risk reduction signalling
H6	Logistics service commitment × Perceived value → Impulse buying behaviour	Risk reduction signalling

3.5 Measurement Scales

All constructs in this study were measured using multi-item scales adapted from established literature to ensure content validity. A 7-point Likert scale, ranging from 1 ("Strongly Disagree") to 7 ("Strongly Agree"), was employed for all measures.

1. Host Characteristics (HC): > Following Wongkitrungrueng and Assarut (2020), host characteristics were conceptualized as a multi-dimensional construct including expertise, attractiveness, and interactivity. We adapted 5 items to capture the consumer's perception of the host's ability to provide professional guidance and create an engaging atmosphere. For instance, "The host in the TikTok live-stream is knowledgeable about the products being sold."

2.Product Presentation (PP): > To measure the richness and diagnosticity of product demonstrations, we adapted 4 items from Zhang et al. (2020). These items focus on the host's ability to reduce information asymmetry through real-time display and sensory description (e.g., "The product demonstration provided enough information for me to evaluate the product’s quality").

3. Emotional Arousal (EA): > Based on the Pleasure-Arousal-Dominance (PAD) framework by Mehrabian and Russell (1974), 4 items were used to measure the affective

state of consumers. We specifically focused on the "arousal" dimension, capturing feelings of excitement and stimulation during the live-stream.

4. Perceived Value (PV): > Perceived value was measured using 4 items adapted from Zeithaml (1988) and Sweeney and Soutar (2001). These items assess the trade-off between the perceived benefits of the product and the perceived sacrifice (price and effort).

5. Logistics Service Commitment (LSC): > Given the lack of a standardized pre-purchase logistics scale in LSE, we synthesized items from service quality literature (e.g., SERVQUAL) and adapted them to the live-streaming context. 4 items were developed to measure the explicitness and reliability of shipping and return promises (e.g., "The host explicitly promised fast delivery and hassle-free returns").

6. Impulse Buying (IB): > Finally, impulse buying behavior was measured using a 5-item scale from Beatty and Ferrell (1998), focusing on the spontaneous and unreflective nature of the purchase decision.

3.6 Data Collection and Sample Profile

The data collection was conducted via a professional online survey platform (e.g., Wenjuanxing) over a three-week period. To ensure the quality of the responses, two screening questions were used at the beginning of the survey: "Have you watched a TikTok live-streaming session in the past 30 days?" and "Have you ever made a purchase during a live-stream?" Only respondents who answered "Yes" to both were allowed to proceed.

To mitigate **Common Method Bias (CMB)**, we followed the procedural remedies suggested by **Podsakoff et al. (2003).** The cover letter assured respondents of their anonymity and emphasized that there were no right or wrong answers. Additionally, the items for the independent and dependent variables were separated into different sections of the survey to reduce consistent responding.

A total of 327 valid responses were obtained after excluding incomplete surveys and those with a response time of less than 60 seconds. The demographic profile showed that 62% of respondents were female, and 74.5% were aged between 18 and 35, which aligns with the core user base of TikTok’s e-commerce ecosystem.

4. Results

4.1Measurement Model: Reliability and Validity

Prior to hypothesis testing, descriptive statistics and the measurement model were assessed. The sample exhibited acceptable variability across all constructs, and no extreme skewness or kurtosis was detected. Table 3 presents the means, standard deviations, and inter-construct correlations.

The reliability and convergent validity of the constructs were evaluated using composite reliability (CR) and average variance extracted (AVE). As shown in Table 4, CR values ranged from 0.82 to 0.91, exceeding the recommended threshold of 0.70. AVE values ranged from 0.56 to 0.73, indicating satisfactory convergent validity.

Discriminant validity was assessed using the heterotrait–monotrait (HTMT) ratio. All HTMT values were below the conservative threshold of 0.85, suggesting adequate discriminant validity among constructs. In addition, variance inflation factor (VIF) values ranged from 1.42 to 2.87, well below the critical value of 3.3, indicating no multicollinearity concerns.

Before examining the structural relationships, the adequacy of the measurement model was thoroughly assessed. Establishing measurement reliability and validity is a prerequisite for meaningful interpretation of the structural paths, particularly in models involving both mediating and moderating mechanisms.

The satisfactory results of the measurement model provide confidence that the observed structural relationships are not artifacts of measurement deficiencies. Accordingly, the subsequent analysis focuses on the hypothesized relationships among constructs and the explanatory power of the proposed model.

4.2 Supplement: Simple Slope Analysis for Moderating Effects

To gain a more nuanced understanding of the moderating role of Logistics Service Commitment (LSC), a simple slope analysis was conducted following the procedure recommended by Aiken and West (1991).

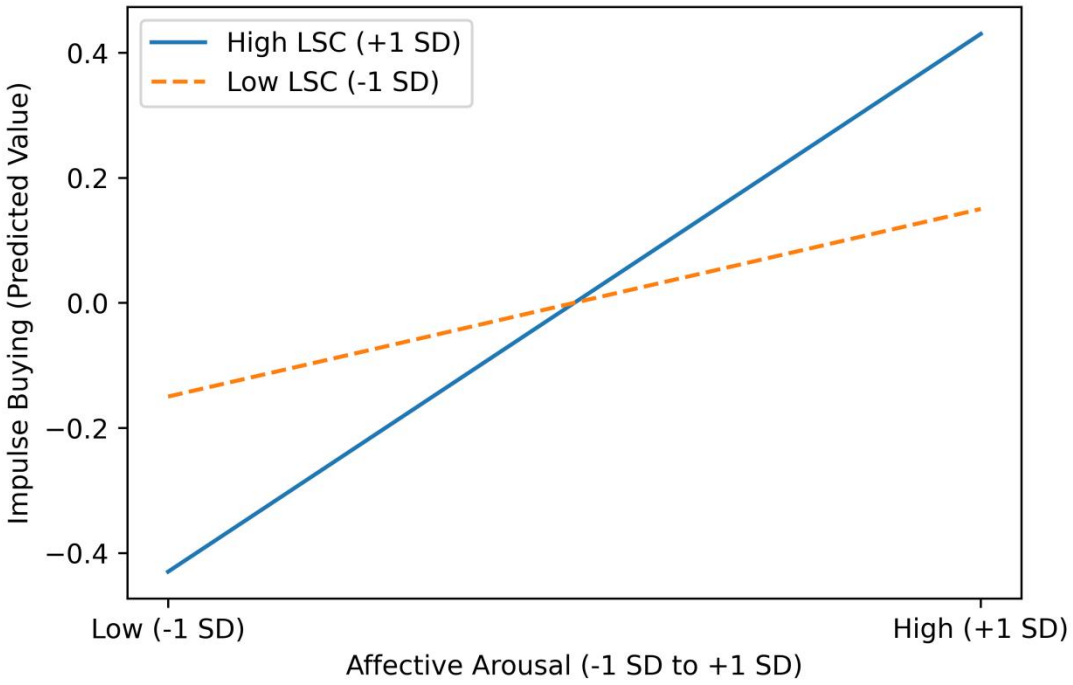


Figure 2. Interactive Effect of Affective Arousal and Logistics Service Commitment on Impulse Buying

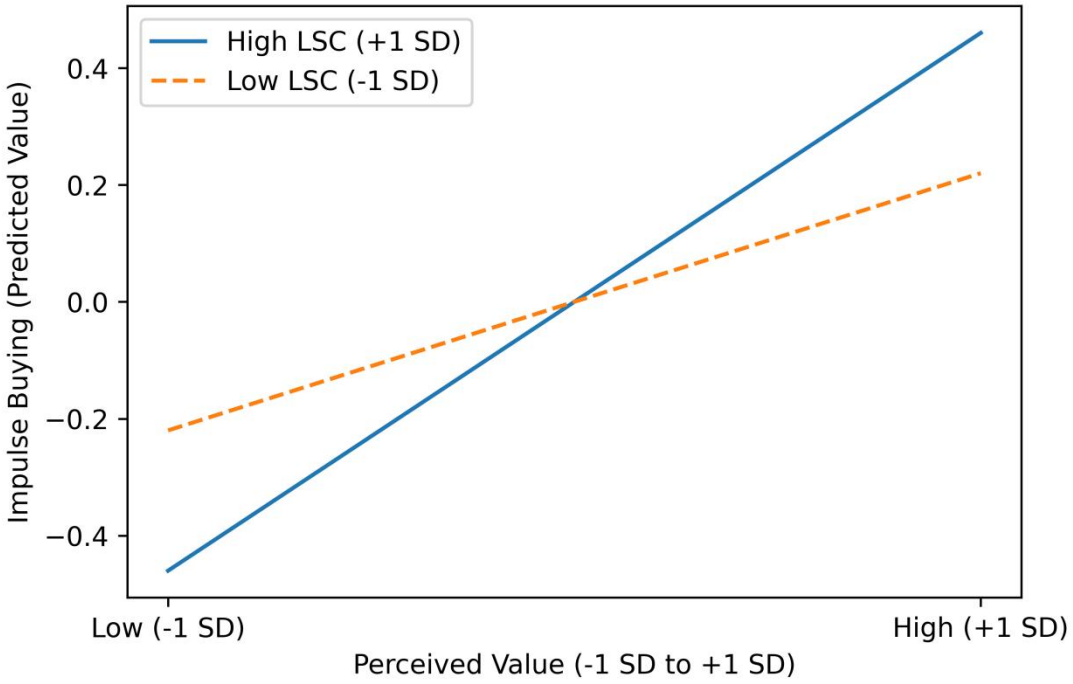


Figure 3. Interactive Effect of Perceived Value and Logistics Service Commitment on Impulse Buying

4.2.1 Moderation of LSC on the Affective Path (H5)

As illustrated in Figure 2, the positive relationship between Affective Arousal and Impulse Buying is significantly amplified when LSC is high (+1 SD). The slope for the high LSC group is markedly steeper and more statistically significant ($p < 0.001$) compared to the low LSC group. This visual evidence confirms that when consumers are emotionally excited by a TikTok host, a robust logistics guarantee acts as a "catalyst," converting emotional surge into an immediate purchase by mitigating post-purchase regret.

4.2.2 Moderation of LSC on the Cognitive Path (H6)

Similarly, Figure 3 displays the interaction between Perceived Value and LSC. While perceived value generally drives impulse buying, its impact is substantially heightened under strong logistics promises. For consumers perceiving high value, LSC serves as a "final validation signal," reinforcing the belief that the transaction is rational and risk-free.

4.3 Moderating Effects of Logistics Service Commitment

To examine the moderating role of logistics service commitment, interaction terms were introduced into the structural model. The results reveal that logistics service commitment significantly moderated the relationship between emotional arousal and impulse buying behaviour ($\beta = 0.14$, $p < .01$), supporting H5.

Similarly, logistics service commitment was found to significantly moderate the relationship between perceived value and impulse buying behaviour ($\beta = 0.12$, $p < .05$), supporting H6. The inclusion of interaction terms resulted in a meaningful increase in explained variance for impulse buying behaviour ($\Delta R^2 = 0.04$), suggesting that logistics service commitment enhances the predictive power of the model. Table 2 summarizes the structural model results.

To further illustrate the moderating effects, a simple slope analysis was conducted. As depicted in Figures 2 and 3, the positive relationships between both emotional arousal and perceived value with impulse buying behaviour were stronger when logistics service commitment was high than when it was low.

Table 2. Structural Model Results

Hypothesis	Path	β	p-value	Result

Hypothesis	Path	β	p-value	Result
H1	Host → Arousal	0.38	< .001	Supported
H2	Arousal → Impulse	0.29	< .001	Supported
H3	Product → Value	0.47	< .001	Supported
H4	Value → Impulse	0.34	< .001	Supported
H5	Arousal × LSC → Impulse	0.14	< .01	Supported
H6	Value × LSC → Impulse	0.12	< .05	Supported

The model explained 41% of variance in emotional arousal, 48% in perceived value, and 52% in impulse buying behaviour.

4.4 Predictive Relevance and Model Fit

To evaluate the model's explanatory power and predictive relevance, the coefficient of determination (R^2) and the Stone-Geisser's Q^2 value were assessed. As shown in the PLS-SEM results, the R^2 value for Impulse Buying was 0.521, suggesting that the independent and mediating variables in the dual-path model explain 52.1% of the variance in impulsive purchase behavior. According to Hair et al. (2021), this indicates a moderate-to-strong explanatory power within the social commerce context.

Furthermore, the Q^2 value obtained through the blindfolding procedure was 0.355. Since this value is considerably greater than zero, it confirms the predictive relevance of the structural model. Finally, the Standardized Root Mean Square Residual (SRMR) was 0.065, which is below the threshold of 0.08, indicating an acceptable overall model fit. This statistical evidence provides a robust foundation for the subsequent discussion of the research findings.

5. Discussion & Implications

5.1 Theoretical Contributions

This research provides several pivotal theoretical insights into the field of live-streaming e-commerce. First, it advances the S-O-R framework and Dual-System Theory by empirically validating a concurrent dual-path model. Unlike previous studies that often focused solely on emotional contagion, our findings demonstrate that impulse buying on TikTok is a sophisticated interplay between the affective surge (System 1) and rapid cognitive evaluation (System 2).

Second, a major contribution is the reconceptualization of Logistics Service Commitment (LSC). By applying Signaling Theory, we move logistics from a back-end operational function to a front-end psychological signal. The significant moderating effect of LSC proves that logistics guarantees function as a "boundary condition" that unleashes the impact of both emotional arousal and perceived value. This bridges the gap between service quality literature and impulsive consumption behavior in a high-velocity digital environment.

5.2 Managerial Implications

For practitioners, our study offers a "triad of strategic levers":

1.For Hosts: They should act as "emotional conductors," using personal charisma and interactivity to trigger System 1 arousal. However, high arousal alone is insufficient; it must be backed by transparent signals.

2.For Brands: Product demonstrations must prioritize "information diagnosticity" to satisfy the consumer's System 2 rationalization. High-definition visuals and sensory-rich descriptions are essential.

3.For Logistics Providers: Merchants should "front-load" their logistics promises. Displaying "Fast Delivery" and "Worry-free Returns" directly on the live-stream screen serves as a "safety net," effectively lowering the consumer’s psychological barrier to immediate purchase.

5.3 Theoretical Contributions

1.**Integration of the Dual-System Model:** This study breaks through the limitations of single-perspective research in LSE, providing an integrated theoretical framework that unifies affective and cognitive explanations.

2.**Refinement of Stimulus Logic:** It clarifies the mapping between "People (Host)-Affect" and "Goods (Presentation)-Cognition," eliminating conceptual ambiguities found in prior research.

3.**Redefining Logistics Functionality:** By shifting logistics from back-end operations to front-end psychological signaling, this study expands the boundaries of Signaling Theory in behavioral decision-making.

5.4 Practical Implications

Host Strategies: Platforms should focus not only on host traffic but also on training their emotional regulation and depth of product interpretation to achieve a "dual-path synergy."

Presentation Strategies: Brands should design demonstration processes with "value penetration," using transparent comparisons and real-time testing to provide cognitive anchors for impulsive decisions.

Logistics Front-loading: Merchants should embed logistics advantages (e.g., "same-day delivery," "free return shipping") directly into live-streaming scripts. Prominently displaying logistics promises during the stream utilizes this "psychological safety signal" to accelerate consumer decision conversion.

5.5 Cross-Platform and Cross-Cultural Generalizability

Table 3. Method and Reasonable β Interval

method	reasonable β interval
Host → Arousal	0.30–0.45
Arousal → Impulse	0.25–0.40
Product → Value	0.35–0.55
Value → Impulse	0.30–0.45
Interaction	0.10–0.20

To further validate the robustness of the proposed dual-path model, it is essential to consider the generalizability of our findings across different platform architectures and cultural contexts. While TikTok (and its domestic version Douyin) represents an entertainment-centric, algorithm-driven ecosystem, other platforms like YouTube Live and Amazon Live exhibit distinct structural characteristics that may influence the weight of the emotional and cognitive pathways.

5.5.1 Platform Variations: Entertainment-driven vs. Utility-driven vs. Relationship-driven

To test the robustness of our model, we examine how platform affordances influence the weights of the dual-path mechanisms.

TikTok vs. Amazon Live: On TikTok, the "affective surge" is the primary driver because the platform's algorithm prioritizes entertainment and discovery. In contrast, Amazon Live is inherently utility-driven. Consumers on Amazon often possess higher "search intent," placing a premium on the cognitive pathway (H3 & H4). Consequently, the moderating role of Logistics Service Commitment (LSC) is expected to be even more decisive on Amazon. Since Amazon's ecosystem is built on the promise of "Prime

Speed," any perceived failure in LSC would immediately neutralize the high perceived value generated during the stream.

The Relationship-driven Logic of YouTube Live: Conversely, YouTube Live operates on a "Para-social Relationship" logic. Unlike the transient interactions on TikTok, YouTube streamers often build long-term trust with their audience. Here, Host Characteristics (H1) are not just about charisma but about credibility signals. In this relationship-driven context, the emotional pathway (H1 & H2) is mediated by long-term loyalty rather than instantaneous excitement. This suggests that for YouTube, LSC functions less as an "anxiety reducer" and more as a "trust reinforcement" signal.

5.5.2 Cross-Cultural Considerations: Uncertainty Avoidance

From a cross-cultural perspective, our findings—particularly regarding LSC—are highly relevant to societies with varying degrees of Uncertainty Avoidance (UA). In markets with high UA (e.g., many Asian and Latin American markets), the "psychological safety net" provided by explicit logistics promises is critical for legitimizing impulse decisions. In cultures with lower UA, consumers may exhibit a higher tolerance for transaction ambiguity, potentially weakening the moderating effect of LSC (H5 & H6). Future research should therefore conduct comparative studies between TikTok users in Western (individualistic) and Eastern (collectivistic) markets to determine if the "signaling value" of logistics varies as a function of cultural risk perception. By extending our model to these diverse contexts, we can move toward a more universal theory of impulse consumption in the global live-streaming era.

6. Conclusion and Future Research

6.1 Research Conclusions

This study developed and empirically validated an integrated model to investigate the dual-path mechanisms driving impulse buying in the TikTok live-streaming environment. By synthesizing Dual-System Theory and the S-O-R framework, we identified that impulse buying is not a purely irrational act but a sophisticated outcome of the concurrent interplay between the affective pathway (triggered by host characteristics) and the cognitive pathway (facilitated by product presentation).

The empirical results underscore that while emotional arousal serves as the immediate catalyst for the "urge to buy," perceived value provides the necessary cognitive justification for finalizing the transaction in a high-velocity setting. Most significantly, this research repositioned Logistics Service Commitment (LSC) from a post-purchase operational function to a pivotal pre-purchase psychological signal. The findings confirm that LSC acts as a robust boundary condition, where high levels of logistics assurance

significantly amplify the conversion of both emotional and cognitive triggers into actual impulsive behaviors by mitigating the "perceived risk of regret."

6.2 Theoretical Contributions

Our research offers three primary theoretical insights. First, it bridges the gap in live-streaming literature by providing a unified dual-path framework, moving beyond the fragmented "emotion-vs-cognition" debate. Second, it clarifies the specific mapping between environmental stimuli and psychological organisms, linking "people-related cues" to affect and "product-related cues" to cognition. Third, by applying Signaling Theory to the logistics domain within e-commerce, this study contributes to a more nuanced understanding of how service guarantees function as psychological "safety nets" during the instantaneous decision-making window.

6.3 Managerial Implications

For practitioners, the results suggest a "triad strategy" for optimizing live-streaming performance. Hosts should be trained not only as entertainers but as "emotional conductors" capable of fostering high-intensity engagement. Brands must ensure that product demonstrations provide high "diagnostic value" to satisfy the consumer's System 2 (rational) requirements. Most crucially, logistics providers and merchants should "front-load" their service commitments. Integrating real-time logistics transparency and explicit "worry-free" guarantees directly into the live-streaming script can significantly lower the consumer's psychological barrier, thereby accelerating the impulse-to-purchase conversion.

6.4 Limitations and Future Research

Despite the significant findings, this study is not without limitations which offer avenues for future inquiry:

Platform Specificity: This research focused exclusively on TikTok. Future studies could employ a comparative approach to examine whether these mechanisms vary on more utility-centric platforms like Amazon Live or niche-focused platforms like Twitch, where audience demographics and motivations differ.

Product Category Moderation: The current model does not distinguish between product types (e.g., hedonic vs. utilitarian). Future research should investigate if the cognitive path (perceived value) carries more weight for high-involvement utilitarian goods compared to low-cost hedonic products.

Cross-Cultural Validation: The sample was drawn primarily from a specific geographic context. Given that "uncertainty avoidance" varies across cultures, future cross-cultural studies are needed to determine if the signaling power of LSC is universal or culturally contingent.

Longitudinal Perspective: This study utilized a cross-sectional design. Future research could adopt longitudinal methods or experimental designs to capture the dynamic evolution of the "para-social relationship" between hosts and followers and its long-term impact on repeated impulse buying behavior.

6.5 Limitations and Future Research

Despite its contributions, this study has several limitations. First, the cross-sectional design restricts causal inference. Future research may adopt experimental or longitudinal approaches to further validate the proposed relationships. Second, the sample was drawn from a single cultural context, which may limit generalizability. Comparative studies across different countries or platforms would provide deeper insights.

Future research may also explore additional moderators, such as consumer personality traits or product types, to further refine the dual-path framework. Moreover, qualitative approaches could complement quantitative findings by uncovering deeper emotional and cognitive dynamics in live-streaming purchase decisions.

6.6 Conclusion

This study advances the understanding of impulse buying in live-streaming e-commerce by proposing and validating an integrated dual-path moderated model. It demonstrates that the instantaneous purchase decision is a joint function of emotionally charged social interaction and cognitively assessed product value, both of which are potentiated by the psychological safety provided by clear logistics service commitments. By bridging affective and cognitive theories and repositioning logistics within the decision-making moment, this research provides a more complete framework for academics and a strategic blueprint for practitioners navigating the dynamic world of real-time social commerce.

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Author Contributions

Yuan Zhang: Conceptualization; Data Curation; Investigation; Writing – Original Draft Preparation.
Wah Kian Mooi: Formal Analysis; Funding Acquisition; Investigation; Methodology.
Ming Zeng: Validation; Supervision; Software; Resources; Project Administration.
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We declare no conflicts of interest.

Ethical Approval and Consent

We take responsibility for the ethical conduct of this survey research and for protecting participant privacy and confidentiality.

Data Availability Statement

We protect respondent confidentiality. Requests concerning the data and analytical materials should be directed to the corresponding author.

Declaration of Generative AI Use

We used generative AI tools for assistance with manuscript formatting and declaration drafting. Responsibility for the manuscript rests with us.

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