

Broke but Buying: When Psychological Arousal Overrides Financial Capacity in Live Streaming Commerce

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Abstract. Drawing upon the Stimulus-Organism-Response (S-O-R) framework and Competitive Arousal Model, this study elucidates the psychological mechanism of online impulsive buying in live streaming commerce. Data from 235 young Indonesian consumers were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results confirm that scarcity cues—specifically Quantity and Time Pressure—significantly heighten psychological Arousal, which serves as a critical mediator driving impulsive behavior. Crucially, the analysis reveals that Financial Capacity does not moderate this relationship, challenging traditional economic assumptions. This suggests that high arousal creates a state of "psychological myopia" where emotional urgency overrides actual financial constraints, rendering consumers equally susceptible to impulsive purchases regardless of their income levels. These findings offer novel theoretical insights into the dominance of emotion over rationality in the digital "shoppertainment" era.

Keywords: Live streaming commerce, online impulsive buying, S-O-R framework, competitive arousal, financial capacity.

1 Introduction

Digital transformation has fundamentally altered the global retail landscape. Consumer interaction patterns have shifted from static browsing on traditional e-commerce platforms toward fully interactive service ecosystems that are instant, entertaining, and seamlessly connected through live streaming commerce (LSC) [1]. The rapid growth of platforms like TikTok Live and Shopee Live highlights the urgent need for continuous innovation in the digital marketing sector [2]. Unlike traditional online shopping, LSC integrates real-time social interaction with entertainment, creating a "shoppertainment" environment where transactions occur in a matter of seconds. Global reports indicate that the live commerce market is growing three times faster than traditional e-commerce [3], demonstrating that real-time engagement is not merely an additional feature but a foundation for the sustainability of modern digital retail.

This dependence on real-time interaction creates a paradox: while LSC offers immersive experiences, it exposes consumers to intense psychological vulnerabilities that threaten rational decision-making [4]. To drive sales, streamers accelerate the adoption of scarcity strategies, specifically through time pressure (limited time offers) and quantity pressure (limited stock availability). Unlike static web stores, these pressures in LSC are amplified by the visual presence of other viewers and the broadcaster's persuasive tactics, creating a seamless but high-pressure experience [5]. Consequently, this environment does not just inform customers about availability; it actively triggers psychological instability, eroding

the cognitive deliberation essential for rational consumption and fostering impulsive buying behaviors. Amid the need for instant gratification, modern consumers in the LSC ecosystem emerge as active competitors rather than passive buyers. Recent studies show a strong orientation among digital natives toward gamified shopping experiences where obtaining a product feels like "winning" a contest (Weits, 2025; Krowinska & Dineva, 2025). This segment exhibits highly reactive behavior, quickly switching between streams, and demands immediate satisfaction. This behavior is reinforced by the "fear of missing out" (FOMO), where the visible depletion of stock in real-time creates a competitive atmosphere. Consequently, for these consumers, the act of purchasing is driven less by utilitarian need and more by the thrill of securing a scarce resource before others do, making the psychological mechanism behind this competition a strategic yet challenging area for investigation.

The high intensity of real-time competition underscores the need for a deeper understanding of the internal psychological mechanisms driving impulse purchases [8]. Within this framework, Arousal becomes the foundational variable. According to the Competitive Arousal Model, the convergence of time and quantity pressures creates an artificial competitive environment that elevates physiological and psychological arousal [9]. This heightened arousal acts as a prerequisite for the transition from "browsing" to "acting," effectively hijacking the consumer's rational cognitive processing. However, this process does not occur in a vacuum. The translation of arousal into actual behavior is theoretically constrained by Financial Capacity [10]. Integrating the Theory of Planned Behavior (TPB), financial capacity serves as the *actual behavioral control*; no matter how high the arousal, the tangible limit of funds should logically moderate the final decision, creating a tug-of-war between emotional urge and economic reality.

Literature on impulsive buying in LSC is developing rapidly, with consensus that scarcity signals can strengthen purchase intentions [11]. However, most studies still position impulsive buying broadly using the S-O-R framework without isolating the specific "competitive" nature of the stimuli [12], [13]. Research generally relies on direct effects (Scarcity Impulse) or simple mediation, rarely placing Competitive Arousal as the distinct psychological engine that explains *why* scarcity works so effectively in live settings [14]. Moreover, methodologically, existing models often overlook the economic boundary conditions. They assume that high arousal automatically leads to buying, neglecting the moderating role of Financial Capacity. It is rare for studies to test whether "having money" amplifies the effect of arousal or whether "lack of money" effectively brakes the impulsive urge despite high arousal levels. This gap underscores the urgency for further research connecting Time/Quantity Pressure, Arousal, and Financial Capacity within a unified conceptual framework.

Based on these gaps, this study aims to examine how Scarcity (Time and Quantity Pressure) influences consumers' Online Impulsive Buying in live streaming commerce through the mediating role of Arousal and the moderating role of Financial Capacity. Building on this rationale, the research employs a quantitative survey to test a moderated mediation model using structural equation modeling. The study advances understanding in three ways: first, by proposing Competitive Arousal as the primary psychological process explaining how situational pressures hijack consumer rationality; second, by integrating the Competitive Arousal Model with TPB elements to capture both the emotional drivers and the economic constraints of impulsive buying; and third, by offering a more realistic view

of consumer behavior where financial capacity is tested as a critical boundary condition. Practically, the findings are expected to provide diagnostic insights for regulators and platforms to balance marketing effectiveness with ethical consumer protection.

2 Literature Review

2.1 An Integrative Framework of Stimulus–Organism–Response and Competitive Arousal Model

The S-O-R framework is rooted in environmental psychology, explaining how external environmental stimuli (S) influence individuals' internal states (O), covering both cognitive and affective processes, which then manifest in behavioral responses (R). This model was introduced by Mehrabian and Russell [15], expanded to the retail context by [16], and adapted to online commerce by Eroglu et al. [17]. In the context of live streaming commerce, Time Pressure and Quantity Pressure function as the environmental stimuli (S). At the organism stage, the internal psychological condition is represented by Arousal—a state of heightened physiological and psychological alertness. Meanwhile, the response is reflected in Online Impulsive Buying, demonstrating the immediate and unreflective urge to purchase. Thus, the S-O-R framework offers a logical flow of explanation, from scarcity cues through the customer's emotional activation to the final impulsive decision.

Despite its comprehensiveness as a structural skeleton, the traditional S-O-R framework is relatively limited in explaining the specific *nature* of the psychological mechanism in live commerce. While S-O-R illustrates *that* stimuli lead to response, it inadequately captures *why* scarcity specifically triggers such intense irrationality in a virtual crowd setting. Standard S-O-R applications often treat "organism" as a generic emotional state (pleasure/dominance) without accounting for the competitive dynamics inherent in live auctions or flash sales [18]. This is crucial because live streaming is not merely a shopping channel but a social arena where viewers compete for limited resources. In other words, S-O-R explains the flow but lacks the theoretical depth to explain the "rivalry-induced irrationality." Therefore, this research integrates the Competitive Arousal Model to inject a more precise theoretical lens into the "Organism" phase of the framework.

The Competitive Arousal Model, developed by Ku et al. [19] and further explored in auction theory [20], posits that time limits and rivalry create a psychological state of "competitive arousal" that impairs rational decision-making. In live streaming, when a host shouts "only 5 items left" (Quantity Pressure) or creates a countdown (Time Pressure), they are not just providing information; they are engineering an artificial competition. This perceived rivalry triggers *arousal*, which acts as a physiological hijacker of the cognitive brain. When arousal peaks, the "winning" mindset overrides the "value-seeking" mindset. Therefore, the Competitive Arousal Model enriches the S-O-R framework by specifying that the "Organism" state in live commerce is not just passive emotion, but a reactive, adrenaline-driven state akin to "auction fever."

The variable selection in this research follows this integrative logic, with a critical addition from the Theory of Planned Behavior (TPB) to address boundary conditions. Time and Quantity Pressure are selected as stimuli because they are the primary scarcity tactics used by streamers to induce urgency. Arousal is prioritized as the mediator because it captures the visceral, physiological reaction to scarcity that cognitive variables (like perceived

value) cannot explain. However, to ground this model in reality, Financial Capacity is introduced as a moderator. Drawing from TPB's concept of *Perceived Behavioral Control* [21], while arousal fuels the urge to buy, financial capacity represents the *actual control* that constrains the behavior. This addresses a major gap in previous impulsive buying studies which often assume that high arousal automatically leads to purchase, neglecting the economic reality that "intention" requires "ability" to become "action."

The integration of S-O-R, Competitive Arousal, and TPB elements produces a comprehensive yet realistic framework. Scarcity cues (S) do not just inform; they ignite competitive rivalry that elevates Arousal (O). This arousal impairs rationality, driving the urge for Impulsive Buying (R). Crucially, this relationship is not unfettered; it is moderated by Financial Capacity, which acts as the economic "brake" on the psychological "accelerator." This integrative framework not only explains the psychological "rush" of live shopping but also the economic constraints, making it highly relevant for understanding consumer behavior in the high-velocity environment of live streaming commerce. The conceptual framework of the research is shown in Figure 1.

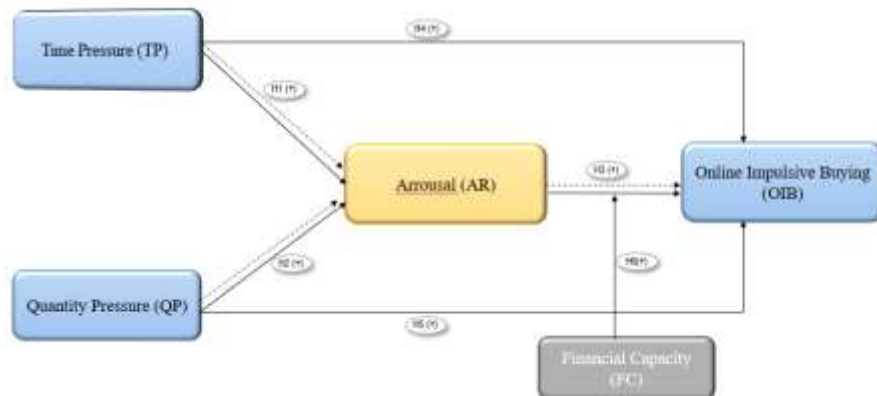


Figure 1. Research Framework

2.2. Hypotheses Development

2.2.1. The Effect of Quantity Pressure on Arousal

Brock & Brannon (1992) defines scarcity within the Commodity Theory as a principle where limiting the availability of a product enhances its perceived value and desirability. In the context of live streaming commerce, this dimension transforms into Quantity Pressure, manifested through real-time indicators of diminishing stock or verbal warnings like "only 5 items left" [23]. According to the Competitive Arousal Model, this perceived scarcity does not merely act as information but triggers a psychological state of rivalry among viewers who compete for the same limited resource [19]. The visual depletion of stock creates a "threat of loss," which hijacks the consumer's cognitive processing and elevates physiological alertness. Thus, Quantity Pressure serves as a critical stimulus that intensifies the consumer's state of readiness and psychological excitement, known as arousal [24].

Previous studies consistently show that scarcity cues are a key factor in triggering emotional arousal. Hao and Huang [25] found that quantity-based scarcity messages in live commerce significantly increase consumers' emotional arousal by evoking a sensation of competition. Similarly, Ma et al. (2022) emphasized that in flash sale contexts, limited

quantity information positively correlates with increased heart rates and attentional focus, which are primary indicators of arousal. Li et al. (2023) highlighted that scarcity promotions effectively stimulate consumer arousal, driving them to conduct impulsive information searches. Furthermore, Shao et al. (2026) demonstrated that competitive arousal is the strongest predictor triggered by quantity scarcity signals in rapid decision-making environments. The consistent findings across these studies indicate that Quantity Pressure is a universal trigger for heightening psychological arousal in online retail and live streaming. Based on this theoretical and empirical foundation, this study proposes the hypothesis:

H1: Quantity Pressure positively affects Arousal.

2.2.2. The Effect of Time Pressure on Arousal

Kong et al. (2025) defines time pressure as a situational constraint that restricts the duration available for decision-making, creating a sense of urgency. This dimension gains prominence in live streaming through mechanisms such as countdown timers and limited-time offers that are valid only during the broadcast [28]. From the perspective of the Competitive Arousal Model, strict time limits act as an emotional accelerator that shortens the cognitive evaluation phase and triggers a "fight or flight" response [29]. This urgency generates a high-stakes atmosphere where the uncertainty of securing a deal before time expires leads to heightened excitement and tension. Consequently, Time Pressure function as a powerful stressor that shifts consumer focus from rational deliberation to an intense affective state or arousal [30]

Previous studies consistently demonstrate that time constraints significantly elevate arousal levels Wang et al. (2025) found that streamer interactions utilizing time pressure tactics effectively increase viewers' emotional arousal, suppressing the emergence of anticipated regret. Similarly, Zhou (2024) confirmed that high exposure to time-pressure strategies in live streaming triggers intense anticipatory emotions. These consistent findings indicate that Time Pressure is a fundamental driver of emotional activation within the digital shopping ecosystem. Based on this theoretical and empirical foundation, this study proposes the hypothesis:

H2: Time Pressure positively affects Arousal.

2.2.3. The Effect of Arousal on Online Impulsive Buying

Mehrabian and Russell [15] define arousal within the S-O-R framework as a state of physiological and psychological activation ranging from drowsiness to excitement. In live streaming commerce, this arousal transforms into a state of "competitive readiness" [19]. High levels of arousal deplete consumers' cognitive resources, temporarily suspending rational evaluation and self-control [33]. The Competitive Arousal Model posits that this adrenaline-fueled state creates a psychological tension that demands immediate release. Consequently, consumers are driven to purchase not for utility, but to satisfy this intense emotional urge and "win" the perceived competition, resulting in unplanned impulsive buying.

Empirical studies consistently confirm arousal as a proximal determinant of impulsive buying. Manan et al. (2025) found that in social commerce, high emotional arousal significantly reduces self-regulation, thereby increasing impulse purchase probability. Similarly, Zhang et al. (2023) highlighted that the vividness of live streaming induces immersion and arousal, which directly translates into immediate buying intention. Zhang et al. [36] empha-

sized that arousal serves as the primary mediator converting marketing stimuli into actual behavior. Furthermore, Tuominen et al. [37] confirmed that excited consumers are more prone to disregarding budget constraints to make spontaneous transactions. These findings indicate that arousal is the psychological engine driving the transition from interest to action. Based on this foundation, this study proposes:

H3: Arousal positively affects Online Impulsive Buying.

2.2.4. The Mediating Role of Arousal

Based on the S-O-R framework, external stimuli (S) do not automatically trigger a behavioral response (R); they must be processed through the individual's internal organism state (O) [15]. In live streaming commerce, Time Pressure and Quantity Pressure act as powerful stimuli that signal scarcity. However, according to the Competitive Arousal Model, these signals alone are merely informational until they ignite a psychological state of arousal—a mixture of anxiety and excitement caused by perceived rivalry [19]. This heightened arousal acts as the essential "psychological bridge" that depletes cognitive resources and suppresses self-control.

Empirical studies consistently confirm this mediating mechanism. Li et al. [38] demonstrated that scarcity cues in live streaming influence purchase intentions significantly only when they successfully elevate the viewer's emotional arousal. Similarly, Wang et al. [31] found that the urgency created by countdown timers and limited stock indicators does not directly cause impulsive buying, but works indirectly by triggering psychological urgency (arousal). Furthermore, Gong et al. [11] highlighted that arousal fully mediates the relationship between scarcity strategies and impulsive behavior, proving that the direct path is insignificant compared to the indirect path via emotion. These findings indicate that arousal is the necessary conduit through which both time and quantity pressures exert their influence on decision-making. Based on this theoretical and empirical foundation, this study proposes:

H4: Arousal mediates the relationship between Time Pressure and Online Impulsive Buying.

H5: Arousal mediates the relationship between Quantity Pressure and Online Impulsive Buying.

2.2.5. The Moderating Role of Financial Capacity

Drawing from the Theory of Planned Behavior [39], behavior is constrained by *actual behavioral control*, represented here by Financial Capacity. While Arousal fuels the psychological urge to buy, Financial Capacity provides the necessary purchasing power to execute it [40]. Without sufficient funds, even high arousal cannot translate into a transaction. Conversely, high financial capacity reduces the "pain of paying," allowing the emotional urge to manifest into impulsive action more rapidly [41]. Thus, financial capacity acts as a catalyst that amplifies the effect of arousal on buying behavior.

Empirical studies support this moderating mechanism. Hoo et al. [42] confirmed that monetary availability significantly strengthens the link between impulsive urges and actual buying. Kim & McGill [43] found that consumers with higher disposable income perceive lower financial risk, making them more susceptible to marketing stimuli. Furthermore, Fenton-O'Creevy & Furnham [44] demonstrated that individuals with greater financial freedom exhibit stronger impulsive tendencies when exposed to promotional triggers. These findings

indicate that the impact of arousal on impulsive buying is contingent upon the consumer's economic resources. Based on this foundation, this study proposes:

H6: Financial Capacity moderates the positive relationship between Arousal and Online Impulsive Buying, such that the relationship is stronger when Financial Capacity is high.

3 Research Method

3.1 Sampling Size and Sampling Procedure

This study employed a quantitative approach with a cross-sectional design, focusing on young consumers in Indonesia who actively engage in live streaming commerce. Indonesia was selected as the research setting because it represents one of the largest and most dynamic "shoppertainment" markets in Southeast Asia. According to the usage data, Millennials and Generation Z constitute the majority of the digital population [45], making them the primary drivers of the e-commerce economy. These cohorts are characterized as digital natives with high mobile dependency and a strong tendency toward "fear of missing out" (FOMO), which aligns perfectly with the real-time, high-pressure nature of live streaming platforms like TikTok Shop and Shopee Live. However, this rapid adoption is accompanied by behavioral vulnerabilities. The intense exposure to scarcity tactics often triggers impulsive buying decisions that may conflict with their actual financial capabilities. These conditions position psychological arousal and financial capacity as critical factors in understanding the sustainability of consumption patterns in the digital era.

The study population was defined as young adults, specifically Millennials (born 1981–1996) and Generation Z (born 1997–2012). For operational purposes, the lower age boundary was set at 17 years old, following Indonesian legal provisions that recognize individuals aged 17 as having full legal capacity to own identification cards (KTP) and conduct independent financial transactions (e.g., opening bank accounts or e-wallets). Since no official sampling frame exists for live streaming users, a non-probability purposive sampling technique was employed. This approach allowed for the deliberate selection of respondents who met specific criteria: (1) resided in Indonesia, (2) fell within the specified age range, and (3) had purchased a product through a live streaming platform in the last three months. This screening ensured that participants possessed recent and relevant experiences regarding the psychological pressure of live shopping, while acknowledging that the findings are not intended for broad statistical generalization [46].

The required sample size was determined through a priori analysis using G*Power 3.1. Parameters included a power level of 0.95, a significance threshold (α) of 0.05, a medium effect size ($f^2 = 0.15$), and five predictors (accounting for the independent variables, mediator, moderator, and potential controls), as recommended by Cohen [47] and Hair et al. [48]. The analysis indicated that a minimum of 138 respondents was necessary to ensure adequate statistical power to detect the hypothesized effects within the structural model.

3.2. Data Collection and Respondent Profile

Data collection was conducted using an online survey distributed via social media platforms to ensure broad reach among digital natives. The survey utilized a purposive sampling technique with specific screening questions to ensure data validity. As shown in

the preliminary screening, out of 235 respondents, 98.7% had watched live streaming commerce, and 94.9% had actual purchasing experience during a live stream. This high eligibility rate confirms that the sample is highly relevant to the research context.

The demographic profile of the respondents (N=235) is presented in Table 1. The sample is predominantly female (76.2%), which aligns with global e-commerce trends where women are often the primary drivers of shopping activities. In terms of age, the majority of respondents belong to Generation Z, with 70.2% aged between 17–25 years, followed by the 26–30 age group (20.0%). This composition strongly supports the study’s focus on young generations who are characteristically impulsive and responsive to digital stimuli.

Table 1. Profile of Respondents (n=235)

Category	Subcategory	Frequency	Percentage (%)
Gender	Male	56	23.8
	Female	179	76.2
Age	17 - 25 Years	165	70.2
	26 - 30 Years	47	20.0
	31 - 40 Years	13	5.5
	> 40 Years	10	4.3
Education Level	High School	113	48.1
	Diploma (D1-D3)	15	6.4
	Bachelor's (S1)	101	43.0
	Postgraduate (S2/S3)	6	2.6
Occupation	Student	112	47.7
	Private Employee	60	25.5
	Government/ASN/TNI/POLRI	22	9.4
	Entrepreneur	20	8.5
	Teacher/Lecturer	7	3.0
	Others (Housewife, Content Creator, etc.)*	14	6.0
Monthly Income	< IDR 1,000,000	61	26.0
	IDR 1,000,000 - 2,999,999	84	35.7
	IDR 3,000,000 - 4,999,999	51	21.7
	> IDR 5,000,000	39	16.6
Domicile	D.I. Yogyakarta	102	43.4
	Central Java	41	17.4
	East Java	25	10.6
	Jabodetabek	23	9.8
	West Java	18	7.7
	Outside Java	26	11.1
Preferred	TikTok Shop	151	64.3

Platform		
	Shopee	84
		35.7
Total	235	100.0

*Note: "Others" includes Housewives (IRT), Content Creators, Healthcare Workers, etc.

Regarding socio-economic background, the respondents are mostly students (47.7%) and private employees (25.5%). Education levels are evenly distributed between High School/Vocational graduates (48.1%) and Bachelor's degree holders (43.0%). In terms of financial capacity, the largest group earns between IDR 1,000,000 – IDR 2,999,999 (35.7%), followed by those earning less than IDR 1,000,000 (26.0%), reflecting the financial profile of students and early-jobbers. Geographically, the respondents are concentrated in the Special Region of Yogyakarta (43.4%) and Central Java (17.4%), though the sample includes representation from Jabodetabek and outside Java. Interestingly, regarding platform preference, TikTok Shop is the dominant channel (64.3%) compared to Shopee Live (35.7%), validating the shift towards social-driven commerce ("shoppertainment"). The detailed demographic breakdown is shown in Table 1.

3.3. Measures

The research instrument was developed by adapting standardized, validated scales from prior studies. All original English-language items were translated into Indonesian using the back-translation method (Brislin, 1986) to ensure conceptual equivalence and enhance respondent comprehension.

The independent variables, Time Pressure and Quantity Pressure, were measured using items adapted from [23] and [49]. Time Pressure (3 items) captures the perceived urgency due to limited duration, while Quantity Pressure (3 items) assesses the perception of scarcity regarding stock availability. The mediating variable, Arousal, was measured using four items adapted from Li et al [26] and Mehrabian and Russell [15], reflecting the respondent's state of excitement, stimulation, and physiological activation during the live stream.

The moderating variable, Financial Capacity, was measured using three items adapted from Ariffin et al. [50], focusing on the individual's perception of their available funds and ability to make discretionary purchases. Finally, the dependent variable, Online Impulsive Buying, was measured using four items adapted from Gong & Liu [11], capturing the sudden, unreflective urge to purchase and the tendency to buy spontaneously.

All items were assessed on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). This scale was chosen to capture the intensity of respondents' attitudes and perceptions with sufficient granularity, aligning with standard practices in consumer behavior research. Table 2 presents a complete list of measurement items for each variable.

3.4. Data Analysis

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) utilizing SmartPLS v4 software. Given the research objectives, this method was selected due to the model's structural complexity, which involves the simultaneous estimation of direct relationships, mediation pathways, and moderation effects (interaction

terms). Since consumer behavioral data measured on a five-point Likert scale often yield non-normal distributions, PLS-SEM was deemed more appropriate than covariance-based SEM (CB-SEM). This approach is highly relevant as PLS-SEM is recognized for its robustness against normality violations, its high statistical power in analyzing interaction effects, and its primary focus on maximizing the explained variance (R^2) of the target constructs for theory development [48].

Model evaluation followed contemporary guidelines for reflective measurement models. The measurement model (outer model) was assessed using outer loadings, Cronbach's alpha, Composite Reliability (ρ_a and ρ_c), and Average Variance Extracted (AVE) to establish convergent validity. Furthermore, discriminant validity was examined using the Heterotrait-Monotrait ratio (HTMT), which is considered superior to the traditional Fornell-Larcker criterion (Henseler et al., 2015). Subsequently, the structural model (inner model) assessment included the examination of collinearity diagnostics (VIF), path coefficients, coefficient of determination (R^2), effect sizes (f^2), and predictive relevance (Q^2) using the blindfolding procedure. Finally, the Standardized Root Mean Square Residual (SRMR) was evaluated to ensure adequate model fit.

4 Results and Discussions

4.1 Result

4.1.1 Common Method Bias (CMB)

Since all data were collected through a single self-administered questionnaire completed by consumers of live streaming commerce, the potential for CMB was addressed to ensure the validity of the findings. Several preventive measures were implemented early in the study to mitigate this risk, including ensuring the respondent's anonymity, randomizing the question order, and assuring participants that there were no right or wrong answers [51]. After data collection, CMB was evaluated using Harman's single-factor test. The principal component analysis revealed that the first unrotated factor explained only 38.64% of the total variance, which is below the common threshold of 50%. Therefore, common method bias did not significantly affect the data quality in this study.

4.1.2. Measurement Model Assessment

The assessment of the measurement model was conducted to establish reliability and validity of the reflective constructs. First, convergent validity was evaluated by examining the outer loadings of each indicator. According to Hair et al. [48], the recommended threshold for outer loadings is 0.708. As presented in Table 2, the majority of the item loadings exceeded this threshold, ranging from 0.716 to 0.898, indicating a strong correlation between the indicators and their respective constructs.

It is noted that one indicator for Time Pressure (TP1) exhibited a loading of 0.686, which is slightly below the 0.708 threshold. However, following the guidelines by Hair et al. (2017), indicators with loadings between 0.40 and 0.70 should only be removed if their deletion leads to an increase in the Composite Reliability (CR) or Average Variance Extracted (AVE). Since the AVE for Time Pressure is already high (0.642), well above the required 0.50 threshold, the TP1 indicator was retained to preserve content validity.

Table 2. Measurement Constructs, Items, and Reliability Statistics					
Construct	Items Measurement	Loading	CR	AVE	
Arousal (AR) <i>(Reflective)</i>	AR1. I feel stimulated when watching the live stream.	0.898	0.939	0.754	
	AR2. I feel excited during the limited-time offers.	0.874			
	AR3. I feel frantic to buy the product before it runs out.	0.851			
	AR4. I feel completely absorbed in the shopping process.	0.875			
	AR5. I feel a strong desire to act immediately.	0.844			
Financial Capacity (FC) <i>(Reflective)</i>	FC1. I have enough money to buy the products offered.	0.847	0.904	0.703	
	FC2. I can afford to purchase items during the live stream.	0.879			
	FC3. My current budget allows for these purchases.	0.852			
	FC5. Buying this product will not cause me financial trouble.	0.772			
Online Impulsive Buying (OIB) <i>(Reflective)</i>	OIB1. I often feel a sudden urge to buy things in live streams.	0.845	0.915	0.684	
	OIB2. I buy products spontaneously without planning.	0.760			
	OIB3. "Buy now, think later" describes my behavior in live streams.	0.839			
	OIB4. It is hard for me to resist the offer during the live stream.	0.839			
	OIB5. I tend to make unplanned purchases when watching streams.	0.851			
Quantity Pressure (QP) <i>(Reflective)</i>	QP1. The limited stock indicator makes me want to buy.	0.716	0.886	0.609	
	QP3. Seeing the stock decrease rapidly creates urgency for me.	0.767			
	QP4. I feel I must compete with others to get the product.	0.842			
	QP5. The "almost sold out" warning pushes me to buy.	0.803			
	QP6. I worry that the product will be gone if I don't act fast.	0.769			
Time Pressure (TP)	TP1. The limited time available forces me to decide quickly.	0.686	0.877	0.642	

<i>(Reflective)</i>	TP2. The countdown timer creates a sense of urgency.	0.822
	TP4. I feel pressured to buy before the flash sale ends.	0.822
	TP5. The short duration of the offer makes me anxious to buy.	0.863

Note: CR = Composite Reliability (rho_c); AVE = Average Variance Extracted.

Table 3. Discriminant Validity – HTMT Ratio					
Construct	1	2	3	4	5
1. Arousal (AR)					
2. Financial Capacity (FC)	0.655				
3. Online Impulsive Buying (OIB)	0.821	0.728			
4. Quantity Pressure (QP)	0.779	0.526	0.722		
5. Time Pressure (TP)	0.700	0.452	0.569	0.806	

Internal consistency reliability was assessed using Composite Reliability (CR) and Cronbach's Alpha. The results demonstrate excellent reliability, with CR values for all constructs ranging from 0.877 (Time Pressure) to 0.939 (Arousal), and Cronbach's Alpha values ranging from 0.813 to 0.919. All values significantly surpass the recommended cut-off of 0.70. Furthermore, the Average Variance Extracted (AVE) for all constructs ranged from 0.609 to 0.754, exceeding the minimum threshold of 0.50. This confirms that the constructs explain more than half of the variance of their indicators, thereby establishing satisfactory convergent validity.

Discriminant Validity Assessment. To ensure that the constructs in the structural model are empirically distinct from one another, discriminant validity was assessed using the Heterotrait-Monotrait ratio of correlations (HTMT). This method is recommended by Henseler et al. [52] as a more sensitive and rigorous approach compared to the traditional Fornell-Larcker criterion. According to Hair et al. [48], the HTMT value should not exceed the threshold of 0.80 (conservative criterion) or 0.90 (liberal criterion) to confirm validity. As presented in Table 3, the results indicate that all HTMT values between the constructs are well below the conservative threshold of 0.85. The highest ratio observed was 0.821 (between Arousal and Online Impulsive Buying), followed by 0.806 (between Time Pressure and Quantity Pressure). These findings confirm that there is no issue of multicollinearity among the latent variables, and each construct represents a unique phenomenon in the research model. Thus, discriminant validity is satisfactorily established.

4.1.3 Evaluation of Structural Models

After confirming the reliability and validity of the measurement model, the analysis proceeded to evaluate the structural model by assessing its explanatory power and predictive capability among the latent variables. This evaluation utilized coefficient of determination (R²), predictive relevance (Q² predict), and Standardized Root Mean Square Residual (SRMR) values as presented in Table 4.

The R² values were 0.533 for Arousal (AR) and 0.622 for Online Impulsive Buying (OIB). According to Hair et al. [48], these values indicate a moderate to substantial ex-

planatory power, with the model explaining 62.2% of the variance in impulsive buying behavior. Furthermore, predictive relevance was assessed via Q2 predict, which yielded positive values for all endogenous constructs (AR = 0.518; OIB = 0.524). These results demonstrate adequate predictive capability consistent with methodological guidelines Hair et al. [48]. Finally, the SRMR value was 0.092, which falls within the accepted threshold of less than 0.100 for PLS-SEM models [53]. These results collectively confirm a well-fitting structural model that adequately explains and predicts the relationships among the constructs in the context of live streaming commerce.

Table 4. R2, Q2 predict, and SRMR

Construct	R2	Q2	SRMR
Arousal (AR)	0.533	0.518	0.092
Online Impulsive Buying (OIB)	0.622	0.524	

Table 5. PLS Predict Assessment

Construct / Item	PLS-SEM (RMSE)	LM (RMSE)	(PLS-LM)	PLS-SEM (MAE)	LM (MAE)	Predictive Power
Arousal (AR)						
AR 1	0.786	0.762	+0.024	0.618	0.588	Low
AR 2	0.721	0.663	+0.058	0.583	0.522	Low
AR 3	0.736	0.737	-0.001	0.570	0.570	Medium
AR 4	0.733	0.677	+0.056	0.570	0.520	Low
AR 5	0.787	0.765	+0.022	0.604	0.548	Low
Impulsive Buying (OIB)						
OIB 1	0.962	0.966	-0.004	0.734	0.737	High
OIB 2	0.879	0.874	+0.005	0.690	0.663	Low
OIB 3	0.891	0.877	+0.014	0.689	0.657	Low
OIB 4	0.883	0.927	-0.044	0.712	0.724	High
OIB 5	0.923	0.944	-0.021	0.710	0.706	High

Note: RMSE = Root Mean Square Error; LM = Linear Model Benchmark. Values in bold indicate that PLS-SEM errors are lower than LM errors, demonstrating superior predictive power.

Predictive Power Assessment (PLS Predict). To further assess the model's out-of-sample predictive power, the PLS Predict procedure was conducted with 10 folds and 10 repetitions [54]. The evaluation focuses on comparing the Root Mean Square Error (RMSE) of the PLS-SEM model against the naive Linear Model (LM) benchmark.

As shown in Table 5, the results for the key dependent variable, Online Impulsive Buying (OIB), demonstrate that the PLS-SEM model produces lower prediction errors (RMSE) compared to the LM benchmark in the majority of indicators (OIB1, OIB4, and OIB5).

Specifically, PLS-SEM outperforms the linear model in 3 out of 5 indicators for impulsive buying, indicating a medium-to-high predictive power for the main outcome variable. Although the predictive power for the mediating variable (Arousal) is relatively lower, the overall Q2 predict values for both constructs (AR = 0.518; OIB = 0.524) remain well above zero, confirming that the model possesses robust predictive relevance.

4.1.4. Hypothesis Testing

With the structural model deemed adequate, hypothesis testing was conducted to evaluate the strength and significance of relationships between constructs. The analysis employed percentile bootstrapping with 5,000 subsamples at a 5% significance level (critical t-value = 1.96), ensuring robust empirical distribution-based path estimates.

As summarized in Table 6 and illustrated in the structural model, the direct hypotheses regarding the drivers of arousal and impulsive buying received strong empirical support. Quantity Pressure (QP) demonstrated a significant positive effect on Arousal (AR) ($\beta = 0.532$; $t = 8.448$; $p < 0.001$), supporting H1. Similarly, Time Pressure (TP) positively influenced Arousal ($\beta = 0.257$; $t = 3.387$; $p = 0.001$), confirming H2. Furthermore, Arousal emerged as a dominant predictor of Online Impulsive Buying (OIB) ($\beta = 0.582$; $t = 9.141$; $p < 0.001$), thus fully supporting H3. Additionally, Financial Capacity (FC) as a control variable showed a direct positive influence on impulsive buying ($\beta = 0.314$; $t = 4.969$; $p < 0.001$).

Mediation analysis further revealed that Arousal plays a critical role as a mechanism that transmits the effect of scarcity signals. The indirect path from Quantity Pressure $\rightarrow$ Arousal $\rightarrow$ Online Impulsive Buying was significant ($\beta = 0.310$; $t = 5.537$; $p < 0.001$). Likewise, the indirect path from Time Pressure $\rightarrow$ Arousal $\rightarrow$ Online Impulsive Buying was also significant ($\beta = 0.149$; $t = 3.306$; $p = 0.001$). These findings underscore that scarcity tactics do not just directly trigger purchases but work by first igniting the consumer's psychological arousal, thereby supporting the mediation hypotheses H4 and H5.

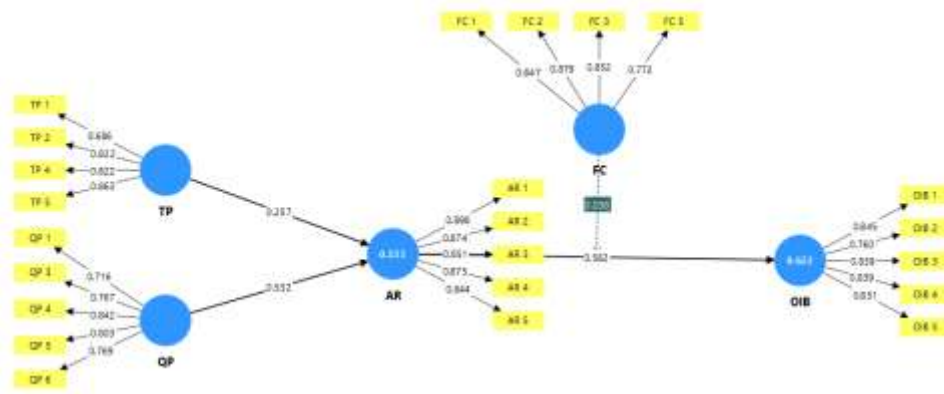
However, regarding the moderating role of Financial Capacity, the analysis showed that the interaction effect (FC $\times$ AR $\rightarrow$ OIB) was not statistically significant ($\beta = 0.038$; $t = 1.202$; $p = 0.230$). This indicates that while financial capacity directly influences buying behavior, it does not significantly strengthen or weaken the specific relationship between arousal and impulsive buying in this study context. Consequently, H6 is not supported.

Table 6. Hypothesis Testing

Hypothesis	Relationship	Original Sample	T-statistics	P-values	Decision
Direct relationship					
H1	QP $\rightarrow$ AR	0.532	8.448	0.000***	Accepted
H2	TP $\rightarrow$ AR	0.257	3.387	0.001**	Accepted
H3	AR $\rightarrow$ OIB	0.582	9.141	0.000***	Accepted
H6	FC $\times$ AR $\rightarrow$ OIB	0.038	1.202	0.230	Rejected
Indirect relationship					
H4	TP $\rightarrow$ AR $\rightarrow$ OIB	0.149	3.306	0.001**	Accepted
H5	QP $\rightarrow$ AR $\rightarrow$ OIB	0.310	5.537	0.000***	Accepted

Note. QP = Quantity Pressure; TP = Time Pressure; AR = Arousal; FC = Financial Capacity; OIB = Online Impulsive Buying.

*** $p < 0.000$; ** $p < 0.01$; * $p < 0.05$.



4.2. Discussion

This study was grounded in the S–O–R (Stimulus-Organism-Response) framework, positioning Time Pressure and Quantity Pressure as the external stimuli that shape the internal state of Arousal, ultimately influencing Online Impulsive Buying. From the perspective of the Competitive Arousal Model, scarcity signals function not merely as information but as psychological triggers that induce a state of rivalry and urgency. This mechanism complements the bounded rationality theory, explaining why consumers in a high-velocity live streaming environment often bypass cognitive evaluation in favor of immediate emotional gratification.

The findings confirm that scarcity strategies—specifically Quantity Pressure and Time Pressure—significantly heighten young customers' psychological arousal in live streaming commerce. This result is consistent with Hao and Huang [25] and Wang et al. (2025), who emphasized the role of limited-stock cues in triggering competitive instincts, and highlighted how countdown timers accelerate the psychological tempo of shoppers. In the Indonesian context, the relevance of this mechanism is heightened because young consumers—immersed in a digital "shoppertainment" culture—are highly susceptible to the Fear of Missing Out (FOMO). For them, the flashing "Sold Out" indicators and host's verbal urgency are not treated as marketing tactics, but as visible markers of product popularity that create social validation. This explains why even products they do not urgently need can trigger intense excitement when presented as "rare opportunities," underscoring that the live streaming format successfully transforms passive viewing into active, adrenaline-fueled participation.

The analysis also shows that Arousal, once triggered, significantly drives Online Impulsive Buying, acting as the most dominant predictor in the model. This result aligns with Manan et al. (2025), who found that high emotional arousal depletes self-regulatory resources, leaving consumers vulnerable to impulse. Faraz & Anjum [41] observed a comparable dynamic in social commerce, where excitement overrides budget constraints. For Indonesian youth, these results suggest that purchase decisions in live streams are shaped not by utility maximization, but by the emotional thrill of "winning" the product against

other viewers. Arousal creates a state of "psychological myopia" where the immediate pleasure of acquisition outweighs long-term financial considerations. However, reliance on high-arousal selling is double-edged; while it generates rapid sales, purchases driven purely by adrenaline may lead to post-purchase regret (buyer's remorse) once the excitement fades. Thus, while arousal is a potent driver of action, it requires platforms to balance urgency with product quality to ensure long-term satisfaction.

Furthermore, the mediation analysis demonstrates that Arousal acts as the critical mechanism linking scarcity signals (Time and Quantity Pressure) to Impulsive Buying. Notably, the Quantity Pressure on Arousal pathway proves stronger than the Time Pressure pathway, indicating that the fear of "losing the item to others" (stock scarcity) is more biologically stimulating than the fear of "losing time" (duration). This finding supports Wang et al. [31], who argued that social competition creates stronger emotional engagement than solitary time constraints. For Indonesian youth, technical scarcity cues are insufficient to drive action unless they successfully ignite this emotional spark. Strategically, this suggests that the effectiveness of live streaming lies not in the discount itself, but in the platform's ability to visualize scarcity in real-time, thereby transforming a static promotion into an emotional race.

Finally, a notable finding in this study is that Financial Capacity does not significantly moderate the relationship between Arousal and Impulsive Buying, leading to the rejection of the moderation hypothesis. The result implies that when Indonesian young consumers enter a state of high arousal, their psychological urge to buy becomes so overwhelming that it temporarily overrides their actual financial reality. Whether a consumer has high or low financial capacity, the intense emotional pressure of the live stream renders them equally susceptible to impulsive actions. This phenomenon is likely exacerbated by the prevalence of "PayLater" and installment options in Indonesian e-commerce, which artificially inflate purchasing power and lower the immediate pain of paying. Consequently, arousal serves as a "great equalizer," blinding consumers to their budgetary constraints in the heat of the moment.

5 Conclusion

This study validates the application of the S-O-R framework within the live streaming commerce context, confirming that external scarcity signals—specifically Quantity and Time Pressure—effectively drive Online Impulsive Buying by triggering the internal mechanism of psychological arousal. The results establish Arousal as the critical mediator, demonstrating that scarcity tactics succeed not through rational evaluation but by igniting a competitive emotional state that demands immediate gratification. Crucially, the finding that Financial Capacity does not moderate the relationship between arousal and impulsive buying reveals a significant behavioral phenomenon: in the high-intensity environment of "shoppertainment," emotional arousal creates a powerful psychological urge that temporarily overrides rational financial constraints, rendering consumers of all income levels equally susceptible to impulsive behavior. Consequently, for marketers targeting digital natives, the primary driver of conversion lies in designing immersive, high-arousal experiences that bypass cognitive filters, rather than relying solely on the consumer's rational financial logic.

Theoretical Implications. Building on these empirical findings, this study contributes to marketing theory by integrating the S–O–R (Stimulus-Organism-Response) framework with the Competitive Arousal Model to explain the psychological mechanisms that shape Online Impulsive Buying behavior in the context of live streaming commerce. From the S–O–R perspective, the findings validate the mechanism of the "shoppertainment" ecosystem's stimulus–organism–response sequence. Quantity Pressure and Time Pressure function as the external *stimuli* that trigger the internal *organism* state of psychological Arousal, subsequently leading to the behavioral *response* of impulsive buying. The dominance of the arousal pathway extends the traditional S–O–R framework by demonstrating that in a high-velocity digital environment, the "organism" processing is not dominated by cognitive evaluation, but by a visceral, physiological reaction that bypasses rational filtering.

From the Competitive Arousal Model perspective, the study highlights that scarcity cues act as triggers for perceived rivalry rather than mere informational signals. The findings confirm that the visibility of depleting stock creates a sense of competition among viewers, escalating arousal to a peak level. Furthermore, the non-significant moderation of Financial Capacity offers a profound theoretical insight: it suggests that high arousal creates a state of "psychological myopia" where emotional urgency overrides economic constraints. This challenges traditional economic utility theories (such as the Theory of Planned Behavior's control beliefs) by positing that in a "hot state," the impulse to secure the product renders the consumer's actual financial capability temporarily irrelevant.

The synthesis of S–O–R and the Competitive Arousal Model produces a more comprehensive conceptual framework. S–O–R explains the sequential structural pathway from external cues to action, while the Competitive Arousal Model clarifies the intensity and irrationality of the underlying psychological state. Thus, this study not only validates the two theories independently but also offers an integrated perspective on how scarcity signals and arousal interact in layered processes to drive young consumers' buying decisions, effectively neutralizing the inhibitory role of financial limitations.

Practical Implications. Translating these theoretical insights into practice, the findings provide several actionable implications for e-commerce platforms and live streamers seeking to optimize sales performance and strengthen young customers' engagement in the digital marketplace. First, Quantity Pressure and Time Pressure are the primary drivers of customer arousal. Platforms should provide dynamic and visible scarcity indicators rather than relying solely on verbal claims. Practical strategies include implementing real-time stock counters that visually deplete (e.g., blinking progress bars), utilizing countdown timers for "flash deals" that reset periodically to maintain urgency, and displaying "someone just purchased" notifications on screen. These measures embed psychological triggers into the viewing experience, ensuring that the fear of missing out becomes a visible and consistent stimulus.

Second, the direct link between Arousal and Impulsive Buying highlights the pivotal role of "shoppertainment" content. This underscores the importance of transforming the selling process into an interactive entertainment experience. Streamers can pursue this through high-energy hosting styles, gamified interactions (such as "fastest fingers first" giveaways), and competitive leaderboards that recognize top viewers. Through such initiatives, the live stream evolves beyond a transactional catalog into an emotionally charged event that keeps viewers in a state of high psychological alert.

Third, the finding that Financial Capacity does not moderate impulsive buying suggests that high arousal effectively overrides consumers' budgetary constraints. To capitalize on this "hot state," platforms should minimize transactional friction. Sellers should integrate seamless payment solutions, particularly "Buy Now, Pay Later" (BNPL) or one-click checkout options, directly within the live stream interface. By reducing the time between the impulse (arousal) and the transaction, platforms can facilitate immediate purchases before the consumer's rational evaluation of their financial limit kicks in.

Finally, the central role of the arousal–impulsive buying pathway highlights the need for post-purchase strategies to mitigate "buyer's remorse." Since purchases are driven by emotion rather than rational planning, customers may feel regret once the excitement fades. Consequently, sellers must manage this risk through rapid order confirmation, high-quality product delivery, and transparent return policies. Such initiatives ensure that the initial impulsive decision is validated by a positive post-purchase experience, thereby reinforcing young customers' intention to return to future live streaming sessions.

Limitations and Future Research Directions. Despite the valuable insights provided, this study acknowledges several limitations that offer avenues for future research. First, the sample was predominantly composed of young consumers (Millennials and Generation Z) in Indonesia, selected through purposive sampling. While this demographic represents the core market of live streaming commerce, the findings may not be generalizable to older generations (Generation X or Baby Boomers) who may exhibit different psychological responses to scarcity cues and technological stimuli. Future research should expand the demographic scope or employ a comparative cross-cultural design to examine whether the "Competitive Arousal" mechanism holds true across different age groups and cultural backgrounds.

Second, the study employed a cross-sectional design, capturing consumer perceptions at a single point in time. Since impulsive buying is a momentary and highly volatile behavior driven by immediate emotions, a survey-based retrospective approach relies heavily on respondents' memory. Consequently, this design cannot fully capture the dynamic fluctuations of arousal during the actual viewing experience. Future scholars are encouraged to adopt experimental designs (e.g., laboratory experiments manipulating countdown timers or stock levels) or longitudinal approaches to track the transition from impulsive purchase to post-purchase behavior, such as satisfaction or regret.

Third, regarding the theoretical framework, this study focused on Financial Capacity as a moderator, which was found to be non-significant. This suggests that "ability to pay" is less relevant than "willingness to pay" in high-arousal situations. Future research could replace this variable with psychological moderators such as Financial Literacy, Self-Control, or PayLater Usage Intensity. It is plausible that while having money (Capacity) does not stop impulse buying, having financial knowledge (Literacy) might serve as a stronger psychological brake against emotional urges.

Finally, this study concentrated primarily on scarcity-based stimuli (Time and Quantity Pressure). However, the live streaming ecosystem is multifaceted. Future studies should integrate other stimuli from the S–O–R perspective, such as Host Attractiveness, Para-Social Interaction (PSI), or Viewer-to-Viewer Interaction, to provide a more holistic understanding of how social dynamics—beyond mere scarcity—contribute to the formation of trust, arousal, and subsequent buying behavior in the digital "shoppertainment" era.

References

- [1] X. Luo, W. M. Lim, J.-H. Cheah, X.-J. Lim, and Y. K. Dwivedi, "Live Streaming Commerce: A Review and Research Agenda," *J. Comput. Inf. Syst.*, vol. 65, no. 3, pp. 376–399, May 2025, doi: 10.1080/08874417.2023.2290574.
- [2] K. Meng, A. T. Bayakhmetova, and M. Falahat, "Harnessing Emotional Arousal In Digital Platforms: Implications For Impulsive Buying Behavior Among Gen Z On Tiktok Live," vol. 12, no. 1, pp. 570–586, 2026, doi: 10.5281/zenodo.11425138.
- [3] H. Zhao and C. Wagner, "Factors influencing TikTok-based user purchase intention: comparison between potential customers and repeat customers," *Internet Res.*, 2023, doi: 10.1108/INTR-07-2022-0542.
- [4] C. Jayawardhena, H. Liu, C. Ranaweera, and P. K. Senyo, "Dynamic Evolution and Transformative Trends in the Consumer Market: A Technology Paradox Perspective," *Psychol. Mark.*, 2026, doi: 10.1002/mar.70114.
- [5] M. Li, M. Cheng, V. Quintal, and I. Cheah, "Facial emotional expressions and real-time viewership in cycling travel live streaming: A mixed-methods approach," *J. Hosp. Tour. Manag.*, vol. 63, pp. 223–235, 2025, doi: <https://doi.org/10.1016/j.jhtm.2025.04.006>.
- [6] E. Weits, "The role of gamification in shaping the brand loyalty of Generation Z consumers," 2025, *University of Cape Town*.
- [7] A. Krowinska and D. Dineva, "The role and forms of social media branded content driving active customer engagement behaviours," *J. Mark. Manag.*, vol. 41, no. 9–10, pp. 1030–1060, Jun. 2025, doi: 10.1080/0267257X.2025.2544808.
- [8] A. Kathuria and A. Bakshi, "Unveiling the dynamics that shape online impulse buying behavior," *J. Res. Interact. Mark.*, vol. 19, no. 5, pp. 770–786, Oct. 2024, doi: 10.1108/JRIM-03-2024-0147.
- [9] F. Kyslík, O. Janoušek, P. Květon, and V. Juřík, "Beyond Violence: Investigating the Impact of Competition on Arousal and Aggression in Violent Video Games," *Media Psychol.*, pp. 1–31, Oct. 2025, doi: 10.1080/15213269.2025.2573472.
- [10] M. Escobar-Farfán, I. Veas-González, E. E. García-Salirrosas, K. Veas-Salinas, V. Veas-Santibañez, and J. Zavala-González, "From Browsing to Buying: Determinants of Impulse Buying Behavior in Mobile Commerce," *J. Theor. Appl. Electron. Commer. Res.*, vol. 20, no. 4, 2025, doi: 10.3390/jtaer20040266.
- [11] M. Gong and H. Liu, "Understanding impulse buying in interest-based e-commerce: the role of content creativity," *Int. J. Retail Distrib. Manag.*, vol. 53, no. 2, pp. 182–198, Nov. 2024, doi: 10.1108/IJRDM-07-2023-0484.
- [12] X. L. Chung *et al.*, "Impulsive buying behaviour in live-streaming commerce: an application of S-O-R theory," *Cogent Soc. Sci.*, vol. 11, no. 1, p. 2474861, Dec. 2025, doi: 10.1080/23311886.2025.2474861.
- [13] Andika, T. N. Anisah, M. Najmudin, and A. E. Sardi, "From Interaction to Transaction: Analyzing the Influence of Social Presence on Impulsive Purchasing in Live Streaming Commerce," *J. Manaj. Teor. dan Ter. J. Theory Appl. Manag.*, vol. 16, no. 3, pp. 454–472, 2023, doi: 10.20473/jmtt.v16i3.49490.
- [14] F. Liu, Y. Zhang, and Z. Li, "How does consumers' scarcity mentality in live-

streaming influence impulse buying behavior? An empirical study from a competitive perspective,” *Asia Pacific J. Mark. Logist.*, pp. 1–24, Dec. 2025, doi: 10.1108/APJML-04-2025-0580.

- [15] J. A. Mehrabian, Albert; Russell, “A Verbal Measure of Information Rate for Studies in Environmental Psychology,” *Environ. Behav.*, vol. 6, no. 2, p. 122, 1974.
- [16] J. (Daisy) Lyu, Y. D. Liang, and D. Vellore Nagarajan, “Optimizing live streaming engagement through store atmospheric cues: exploring prosocial behavior and social comparison—insights from streamers and viewers,” *Internet Res.*, vol. 35, no. 2, pp. 882–911, Aug. 2024, doi: 10.1108/INTR-01-2024-0073.
- [17] S. Eroglu, K. A. Machleit, L. Davis, and L. M. Davis, “Atmospheric qualities of online retailing,” *J. Bus. Res.*, 2001, doi: 10.1016/s0148-2963(99)00087-9.
- [18] R. S. Chatterjee, M. Hosen, I. Hameed, and H. M. Rehman, “Trust transference and cognitive affective trust dichotomy in TikTok short-form videos: The moderating role of source homophily,” *J. Innov. Knowl.*, vol. 12, p. 100890, 2026, doi: <https://doi.org/10.1016/j.jik.2025.100890>.
- [19] G. Ku, D. Malhotra, and J. K. Murnighan, “Towards a competitive arousal model of decision-making: A study of auction fever in live and Internet auctions,” *Organ. Behav. Hum. Decis. Process.*, vol. 96, no. 2, pp. 89–103, 2005, doi: <https://doi.org/10.1016/j.obhdp.2004.10.001>.
- [20] M. T. P. Adam, J. Krämer, and M. B. Müller, “Auction Fever! How Time Pressure and Social Competition Affect Bidders’ Arousal and Bids in Retail Auctions,” *J. Retail.*, vol. 91, no. 3, pp. 468–485, 2015, doi: <https://doi.org/10.1016/j.jretai.2015.01.003>.
- [21] I. Ajzen, “The theory of planned behavior,” *Organ. Behav. Hum. Decis. Process.*, vol. 50, no. 2, pp. 179–211, 1991.
- [22] T. C. Brock and L. A. Brannon, “Liberalization of Commodity Theory,” *Basic Appl. Soc. Psych.*, vol. 13, no. 1, pp. 135–144, Mar. 1992, doi: 10.1207/s15324834basp1301_11.
- [23] D. Kong, S. Zhan, and Y. Zhu, “Can time pressure promote consumers’ impulse buying in live streaming E-commerce? Moderating effect of product type and consumer regulatory focus,” *Electron. Commer. Res.*, vol. 25, no. 4, pp. 3223–3259, 2025, doi: 10.1007/s10660-023-09788-0.
- [24] J. Cao, G. Zhang, D. Liu, and M. Shang, “Influencing factors of users’ shift to buying expensive virtual gifts in live streaming: Empirical evidence from China,” *Front. Psychol.*, vol. Volume 13, 2022, doi: 10.3389/fpsyg.2022.997651.
- [25] S. Hao and L. Huang, “The persuasive effects of scarcity messages on impulsive buying in live-streaming e-commerce: the moderating role of time scarcity,” *Asia Pacific J. Mark. Logist.*, vol. 37, no. 2, pp. 441–459, Aug. 2024, doi: 10.1108/APJML-03-2024-0269.
- [26] X. Li, M. Guo, and D. Huang, “The role of scarcity promotion and cause-related events in impulse purchase in the agricultural product live stream,” *Sci. Rep.*, vol. 13, no. 1, p. 3800, 2023, doi: 10.1038/s41598-023-30696-8.
- [27] B. Shao, Y. Zhu, P. Yang, and Y. Qin, “When sparks fly: How arousal-driven atmospheres, brand positioning, and consumer traits collide in live-streaming ecosystems,” *J. Retail. Consum. Serv.*, vol. 88, p. 104534, 2026, doi: <https://doi.org/10.1016/j.jretconser.2025.104534>.

- [28] Y. Shi, Y. Ma, H. Feng, J. Liu, and Q. Xiao, "Leveraging store atmosphere tool in live streaming to foster consumer post purchase intention: The role of time scarcity," *Acta Psychol. (Amst.)*, vol. 260, p. 105529, 2025, doi: <https://doi.org/10.1016/j.actpsy.2025.105529>.
- [29] G. Ku and M. T. P. Adam, *Competitive arousal: Sources, effects, and implications*. 2021.
- [30] B. Sun, Y. Zhang, and L. Zheng, "Relationship between time pressure and consumers' impulsive buying&Role of perceived value and emotions," *Heliyon*, vol. 9, no. 12, Dec. 2023, doi: [10.1016/j.heliyon.2023.e23185](https://doi.org/10.1016/j.heliyon.2023.e23185).
- [31] C. Wang, B. Chen, S. Hu, and J. Li, "Streamer interaction and consumer impulsive buying in live-stream commerce: the mediating roles of trust and emotional arousal with anticipated regret as boundary condition," *Front. Commun.*, vol. Volume 10, 2025, doi: [10.3389/fcomm.2025.1547639](https://doi.org/10.3389/fcomm.2025.1547639).
- [32] R. Zhou, "The impact of scarcity promotions in live streaming e-commerce on purchase intention: the mediating effect of emotional experience," *Asia Pacific J. Mark. Logist.*, vol. 37, no. 7, pp. 1733–1749, Dec. 2024, doi: [10.1108/APJML-04-2024-0475](https://doi.org/10.1108/APJML-04-2024-0475).
- [33] N. Duan, L. Li, K. Kanchanapoom, Z. Qi, and T. Xu, "The impact of social media overload on learning engagement: a moderated mediation model," *BMC Psychol.*, vol. 13, no. 1, p. 1322, 2025, doi: [10.1186/s40359-025-03557-4](https://doi.org/10.1186/s40359-025-03557-4).
- [34] K. A. Manan, J. Li, S. N. A. A. Tajuddin, and S. Samsudin, "Factors Influencing Online Impulsive Buying Intentions on Weibo: The Mediating Role of Arousal," *Pertanika J. Soc. Sci. Humanit.*, vol. 33, no. 5, pp. 2095 – 2125, 2025, doi: [10.47836/pjssh.33.5.13](https://doi.org/10.47836/pjssh.33.5.13).
- [35] X. Zhang, X. Cheng, and X. Huang, "'Oh, My God, Buy It!' Investigating Impulse Buying Behavior in Live Streaming Commerce," *Int. J. Hum. Comput. Interact.*, vol. 39, no. 12, pp. 2436 – 2449, 2023, doi: [10.1080/10447318.2022.2076773](https://doi.org/10.1080/10447318.2022.2076773).
- [36] Y. Zhang, X. Yan, T. Zhang, and W. Fan, "From stress to impulse buying: the perspective of informational conformity and competitive arousal in livestreaming e-commerce," *Electron. Commer. Res.*, 2025, doi: [10.1007/s10660-025-10057-5](https://doi.org/10.1007/s10660-025-10057-5).
- [37] J. Tuominen, J. Nyrhinen, E. Rantala, and T.-A. Wilska, "Stimulation values and life satisfaction among young people: the role of impulsive buying and financial problems," *Young Consum. Insight Ideas Responsible Mark.*, vol. 26, no. 7, pp. 92–110, Jan. 2025, doi: [10.1108/YC-07-2024-2142](https://doi.org/10.1108/YC-07-2024-2142).
- [38] Z. Li *et al.*, "Impact of Scene Features of E-Commerce Live Streaming on Consumers' Flow and Purchase Intentions of Sporting Goods," *Behav. Sci. (Basel)*, vol. 15, no. 2, 2025, doi: [10.3390/bs15020238](https://doi.org/10.3390/bs15020238).
- [39] I. Ajzen and I. Ajzen, "From Intentions to Actions: A Theory of Planned Behavior," *null*, 1985, doi: [10.1007/978-3-642-69746-3_2](https://doi.org/10.1007/978-3-642-69746-3_2).
- [40] W. Abdallah, A. Harraf, H. Ghura, and M. Abrar, "Financial literacy and small and medium enterprises performance: the moderating role of financial access," *J. Financ. Report. Account.*, vol. ahead-of-p, no. ahead-of-print, Jan. 2024, doi: [10.1108/JFRA-06-2024-0337](https://doi.org/10.1108/JFRA-06-2024-0337).
- [41] N. Faraz and A. Anjum, "Spendception: The Psychological Impact of Digital Payments on Consumer Purchase Behavior and Impulse Buying," *Behav. Sci. (Basel)*, vol. 15, no. 3, 2025, doi: [10.3390/bs15030387](https://doi.org/10.3390/bs15030387).

- [42] W. C. Hoo, S. Kumar, S. Ramli, and S. Madhavedi, "Factors influencing customer behavior in impulse buying of cosmetics on live shopping platforms in Malaysia," *Humanit. Soc. Sci. Lett.*, vol. 13, no. 1, pp. 270 – 284, 2025, doi: 10.18488/73.v13i1.4094.
- [43] H.-Y. Kim and A. L. McGill, "Minions for the rich? Financial status changes how consumers see products with anthropomorphic features," *J. Consum. Res.*, vol. 45, no. 2, pp. 429 – 450, 2018, doi: 10.1093/jcr/ucy006.
- [44] M. Fenton-O'Creevy and A. Furnham, "Money Attitudes, Personality and Chronic Impulse Buying," *Appl. Psychol.*, vol. 69, no. 4, pp. 1557 – 1572, 2020, doi: 10.1111/apps.12215.
- [45] Z. Rosnerova, O. Ponisciakova, E. Kicova, and M. Strenitzerova, "The Impact of the Digital World on the Buying Behaviour of Generation Z," *Adm. Sci.*, vol. 15, no. 12, 2025, doi: 10.3390/admsci15120459.
- [46] I. Etikan, "Comparison of Convenience Sampling and Purposive Sampling," *Am. J. Theor. Appl. Stat.*, vol. 5, no. 1, p. 1, 2016, doi: 10.11648/j.ajtas.20160501.11.
- [47] J. Cohen, "Statistical Power Analysis," *Curr. Dir. Psychol. Sci.*, vol. 1, no. 3, pp. 98–101, 1992, doi: 10.1111/1467-8721.ep10768783.
- [48] J. Hair and A. Alamer, "Partial Least Squares Structural Equation Modeling (PLS-SEM) in second language and education research: Guidelines using an applied example," *Res. Methods Appl. Linguist.*, vol. 1, no. 3, p. 100027, 2022, doi: <https://doi.org/10.1016/j.rmal.2022.100027>.
- [49] J. Wang, A. N. Alkhaledi, T. J. Hughes, and P. A. Webley, "Technoeconomic investigation of optimal storage pressure and boil-off gas utilisation in large liquid hydrogen carriers," *Appl. Energy*, vol. 384, p. 125356, 2025, doi: <https://doi.org/10.1016/j.apenergy.2025.125356>.
- [50] S. K. Ariffin, F. Ng, and A. M. A. Mohsin, "Examining the influencing factors of consumer purchase intention toward fast food with health concerns as a moderator," *J. Entrep. ...*, 2021.
- [51] P. M. Podsakoff, S. B. MacKenzie, J.-Y. Lee, and N. P. Podsakoff, "Common method biases in behavioral research: a critical review of the literature and recommended remedies," *J. Appl. Psychol.*, vol. 88, no. 5, p. 879, 2003.
- [52] J. Henseler, C. M. Ringle, and M. Sarstedt, "A new criterion for assessing discriminant validity in variance-based structural equation modeling," *J. Acad. Mark. Sci.*, vol. 43, no. 1, pp. 115–135, 2015, doi: 10.1007/s11747-014-0403-8.
- [53] J. Henseler *et al.*, "Common Beliefs and Reality About PLS: Comments on Rönkkö and Evermann (2013)," *Organ. Res. Methods*, vol. 17, no. 2, pp. 182–209, 2014, doi: 10.1177/1094428114526928.
- [54] G. Shmueli *et al.*, "Predictive model assessment in PLS-SEM: guidelines for using PLSpredict," *Eur. J. Mark.*, vol. 53, no. 11, pp. 2322–2347, Jun. 2019, doi: 10.1108/EJM-02-2019-0189.