

UNDERSTANDING IMPULSIVE BUYING IN LIVE-STREAMING COMMERCE: THE ROLE OF STREAMER-DISPLAYED EMOTIONS, CUSTOMER ENGAGEMENT, AND TIME PRESSURE



Hendri Triyanto¹
Universitas Sebelas Maret, Surakarta, Indonesia
hendri.triyanto11@student.uns.ac.id

Budhi Haryanto²
Universitas Sebelas Maret, Surakarta, Indonesia
budhiharyanto_fe@staff.uns.ac.id

Abstract

This study examines the role of streamers' positive emotional expressions specifically pleasure and arousal in shaping impulsive purchasing behavior in TikTok live-streaming commerce. Guided by the Stimulus–Organism–Response (S-O-R) framework, the model positions customer engagement as an intervening variable, while perceived time pressure is incorporated as a boundary condition influencing the relationships. Data were collected through a survey of 260 Generation Z consumers (aged 18–29) who had recently engaged in purchasing via TikTok live streams. The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results indicate that both emotional dimensions significantly enhance customer engagement, with arousal showing a more dominant influence. Increased engagement, in turn, leads to a higher tendency toward impulsive buying, highlighting its role in translating emotional stimuli into behavioral outcomes. While pleasure also directly affects impulsive purchasing, its effect is comparatively less pronounced. Interestingly, perceived time pressure weakens the relationship between engagement and impulsive buying, suggesting that excessive urgency may discourage spontaneous purchasing decisions. Overall, this study enriches the literature by reinterpreting streamer-generated emotions as external stimuli and by revealing the nuanced role of time pressure in live-streaming commerce. The findings also provide actionable insights for optimizing live-streaming strategies in social commerce environments.

Keywords: Streamer Emotion, Customer Engagement, Impulsive Buying, Live-Streaming Commerce, Time Pressure, TikTok Shop

INTRODUCTION

Advances in digital technology have significantly reshaped the way consumers behave, particularly with the rise of live-streaming commerce. This format combines social interaction and transactional processes within a unified digital space. In contrast to conventional e-commerce, live-streaming commerce allows direct, real-time interaction between sellers and consumers, resulting in a more dynamic and engaging shopping experience, immersive, and experience-driven shopping environment. TikTok Shop has emerged as one of the most influential platforms in this domain, especially in Indonesia, which represents one of the largest markets globally. According to DataReportal (2024), Indonesia has more than 108 million TikTok users aged 18 and above, indicating a substantial user base for social commerce activities. In addition, DataReportal (2024) reported that the gross merchandise value (GMV) of TikTok Shop in Southeast Asia reached approximately US\$16.3 billion, with Indonesia contributing the largest share. At the behavioral level, Center (2025) highlights that nearly 80% of transactions on TikTok Shop are influenced by live-streaming features, which can increase sales performance by up to seven times compared to conventional online selling methods. These findings suggest that live streaming has evolved into a strategic marketing tool capable of stimulating consumer purchasing behavior, particularly impulsive buying.

Despite this substantial growth, empirical observations reveal inconsistencies between audience engagement and actual purchase conversion. In practice, not all live-streaming sessions with high viewer numbers lead to significant sales outcomes, while some sessions with relatively smaller audiences generate higher conversion rates. This discrepancy indicates a phenomenon gap, where high exposure and interaction do not necessarily translate into impulsive purchasing decisions. Prior research suggests that such inconsistency may be attributed to the quality of interaction and communication strategies employed by streamers, particularly in terms of emotional expression and persuasive delivery (Ma et al., 2024; Wongkitrungrueng & Assarut, 2020). Therefore, the effectiveness of live-streaming commerce is not solely determined by the size of the audience, but also by how streamers create emotionally engaging experiences that can influence consumer decision-making.

Within the context of live-streaming commerce, streamers act as central agents who simultaneously perform informational, persuasive, and entertainment roles. A critical aspect of streamer performance lies in the positive emotions they display, particularly pleasure and arousal. These emotions are actively projected through facial expressions, tone of voice, communication style, and energy levels during live sessions. Unlike internal emotional states experienced by consumers, streamer-displayed emotions function as external stimuli that shape audience perception and interaction. Empirical evidence indicates that emotional expressions of streamers significantly influence audience responses, including attention, perceived enjoyment, and engagement (Luo et al., 2024; Ma et al., 2024). Furthermore, research has shown that pleasure-related expressions enhance consumers' affective responses, while arousal-related expressions increase psychological stimulation and urgency, which can trigger impulsive purchasing behavior (Chen & Lin, 2018; X. Zhang et al., 2022). However, most existing studies conceptualize emotions as consumer responses rather than as stimuli generated by streamers, thereby overlooking the role of emotional display as a key driver in live-streaming environments.

Another limitation in the literature concerns the lack of clarity regarding the underlying psychological mechanisms that link streamer-displayed emotions to impulsive buying behavior. In this regard, customer engagement has been widely recognized as a critical construct in explaining consumer responses in digital environments. Customer engagement refers to the degree of cognitive, emotional, and behavioral involvement that consumers exhibit during interactions with a brand or platform (Brodie et al., 2011; Hollebeek et al., 2021). In live-streaming commerce, engagement manifests through activities such as commenting, liking, sharing, and sustained attention during live sessions. Previous studies have demonstrated that higher levels of engagement increase the likelihood of impulsive buying, as consumers become more immersed in the experience and less likely to engage in rational evaluation (Luo et al., 2024; Sun et al., 2023). Nevertheless, empirical research examining customer engagement as a mediating mechanism between streamer-displayed emotions and impulsive buying remains limited, particularly within the context of TikTok Shop.

In addition to engagement, live-streaming commerce is characterized by the presence of perceived time pressure, which is often induced through mechanisms such as limited-time offers, countdown timers, and direct calls to action from streamers. Time pressure has been identified as a situational factor that accelerates decision-making by reducing consumers' ability to process information thoroughly (Dhar & Nowlis, 1999). In digital commerce settings, perceived time pressure has been found to significantly increase impulsive buying tendencies by encouraging spontaneous decisions and minimizing cognitive deliberation (Sun et al., 2023). However, most prior studies focus on the direct effect of time pressure, while its role as a moderating variable that strengthens the relationship between engagement and impulsive buying remains underexplored, particularly in live-streaming contexts.

Based on the above discussion, several research gaps can be identified. First, there is a lack of studies that conceptualize positive emotions as expressions displayed by streamers rather than as emotions experienced by consumers. Second, limited research distinguishes between pleasure and arousal as separate dimensions of positive emotional display. Third, the integration of customer engagement as a mediating mechanism in this relationship remains insufficiently explored. Fourth, the moderating role of perceived time pressure in strengthening the engagement–impulsive buying relationship has not been comprehensively examined within live-streaming commerce.

To address these gaps, the present study employs the Stimulus–Organism–Response (S-O-R) framework (Mehrabian & Russell, 1974; Mingwei et al., 2022). In this model, positive emotions expressed by streamers namely pleasure and arousal are conceptualized as stimuli, customer engagement serves as the organism, and impulsive buying behavior represents the response. Within this framework, perceived time pressure is incorporated as a moderating variable that shapes the influence of engagement on impulsive purchasing. This perspective enables a more holistic explanation of how external cues in live-streaming settings affect internal psychological processes and subsequently drive consumer behavior.

Accordingly, this study makes several contributions to the existing literature. First, it extends prior research by highlighting streamer-generated emotional expressions as key external stimuli, rather than focusing solely on consumer perceptions. Second, it treats pleasure and arousal as distinct constructs, offering a more refined understanding of emotional effects in live-streaming commerce. In addition, the study integrates customer

engagement as a mediating mechanism and positions perceived time pressure as a moderating factor within a unified conceptual model. Empirically, it contributes by examining TikTok Shop live-streaming practices in Indonesia, a context that remains relatively underexplored in the global literature. Therefore, this research is expected to provide both theoretical insights for social commerce studies and practical guidance for enhancing the effectiveness of live-streaming strategies through improved emotional and interactive performance.

REVIEW OF LITERATURE

This study is based on the Stimulus–Organism–Response (S-O-R) framework (Mehrabian & Russell, 1974), which describes how external environmental stimuli affect individuals' internal psychological conditions and ultimately shape their behavioral outcomes. In the context of live-streaming commerce, this framework provides a useful lens for understanding how different cues in digital environments influence consumer decision-making processes. In particular, the positive emotional expressions displayed by streamers, such as pleasure and arousal, are treated as external stimuli that affect consumers' internal states, reflected in their level of customer engagement. This internal response then translates into observable behavior, namely impulsive buying (Mehrabian & Russell, 1974).

In live-streaming commerce, streamers act as key agents who actively construct the shopping environment through their communication style, emotional expressions, and interaction strategies. Unlike traditional retail settings, where environmental cues are largely static, live-streaming environments are dynamic and socially interactive, allowing streamers to continuously influence consumer perceptions in real time. Prior research has demonstrated that emotional cues in digital environments play a significant role in shaping consumer behavior by capturing attention, enhancing enjoyment, and increasing involvement (Chen & Lin, 2018; R. Zhang et al., 2023). However, most studies have focused on emotions as internal consumer responses, rather than as externally displayed stimuli generated by streamers, which represent a critical yet underexplored aspect in live-streaming commerce.

Customer engagement is generally defined as a multidimensional construct encompassing consumers' cognitive, emotional, and behavioral involvement in their interactions with a brand or platform (Brodie et al., 2011; Hollebeek et al., 2021). In the context of live-streaming, engagement is reflected in behaviors such as commenting, liking, sharing, and prolonged viewing. Greater engagement signifies a higher level of immersion in the live-streaming experience, which can reduce reliance on rational evaluation and increase consumers' tendency toward impulsive purchasing decisions (Luo et al., 2024).

Moreover, perceived time pressure represents an important situational factor in live-streaming commerce, often generated through limited-time offers, countdown features, and persuasive prompts. Prior research suggests that time pressure can speed up decision-making while limiting cognitive processing, thereby raising the likelihood of impulsive buying (Dhar & Nowlis, 1999). From the perspective of the S-O-R framework, time pressure can be viewed as a contextual variable that amplifies the relationship between internal states (such as engagement) and behavioral outcomes (impulsive buying).

Pleasure refers to the extent to which the streamer conveys a sense of enjoyment, positivity, and satisfaction during live streaming. When streamers display pleasurable emotions, they create a positive and enjoyable viewing experience, which can attract and

retain audience attention. Such emotional displays enhance consumers' affective responses and increase their willingness to interact with the content. Prior research suggests that positive emotional cues significantly enhance user engagement by fostering a more enjoyable and immersive experience (Luo et al., 2024; Wongkitrungrueng & Assarut, 2020). Therefore, streamer-displayed pleasure is expected to positively influence customer engagement.

H1: Streamer-displayed pleasure has a positive effect on customer engagement.

Arousal represents the degree of excitement, intensity, and energetic expression demonstrated by the streamer during live-streaming sessions. Elevated levels of arousal can heighten consumers' alertness and focus, which in turn fosters greater involvement in the live-streaming experience. In highly stimulating contexts, individuals are more inclined to actively interact and engage with the presented content. Prior empirical evidence suggests that arousal significantly contributes to enhancing user interaction and engagement within digital environments (X. Zhang et al., 2022). Therefore, the level of arousal displayed by the streamer is expected to positively influence customer engagement.

H2: Streamer-displayed arousal has a positive effect on customer engagement.

Customer engagement represents the level of consumers' involvement in live-streaming interactions. Highly engaged consumers are more immersed in the experience and are less likely to engage in deliberate decision-making processes. Instead, they are more prone to making spontaneous and unplanned purchases. Prior studies have consistently shown that engagement significantly increases impulsive buying tendencies, as it enhances emotional involvement and reduces cognitive control (Sun et al., 2023; Wei et al., 2022). Therefore, customer engagement is expected to positively influence impulsive buying behavior.

H3: Customer engagement has a positive effect on impulsive buying behavior.

Within the Stimulus–Organism–Response (S-O-R) framework, customer engagement is conceptualized as a psychological mechanism that links external stimuli to subsequent behavioral outcomes. Emotional cues delivered by streamers particularly pleasure and arousal are expected to influence impulsive buying indirectly through their impact on engagement. When audiences are exposed to emotionally expressive content, their level of involvement in the live-streaming session tends to increase, which subsequently elevates the likelihood of impulsive purchasing. This mediating function of customer engagement aligns with prior research highlighting its role in connecting environmental stimuli with consumer responses (Brodie et al., 2011; Hollebeek et al., 2021).

H4: Customer engagement mediates the relationship between streamer-expressed pleasure and impulsive buying behavior.

H5: Customer engagement mediates the relationship between streamer-expressed arousal and impulsive buying behavior.

Building on the proposed hypotheses, this study constructs a conceptual framework to explore how streamer-expressed pleasure and arousal are associated with customer engagement, perceived time pressure, and impulsive buying behavior within live-streaming commerce. The overall research model is presented in Figure 1.

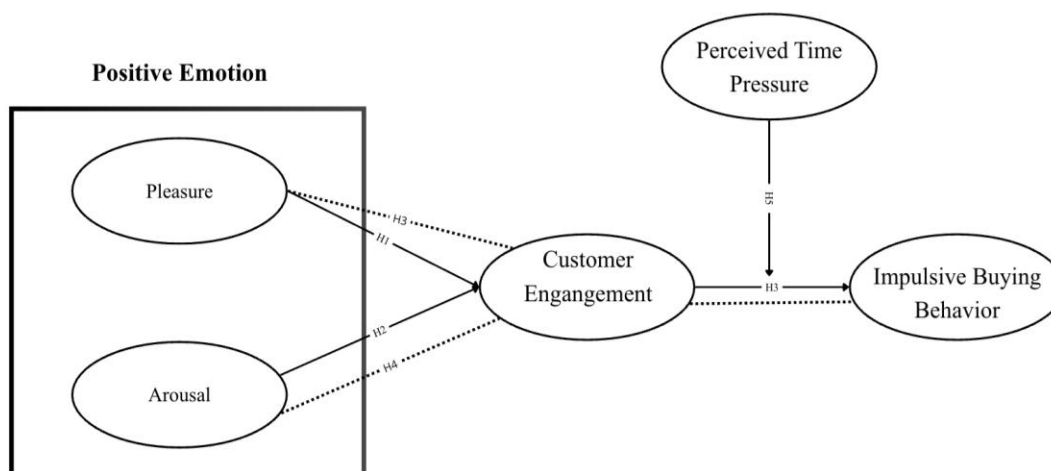


Figure 1.
Research Model

RESEARCH METHOD

This study employs a quantitative approach using a cross-sectional survey design to investigate the relationships among streamer-displayed positive emotions (pleasure and arousal), customer engagement, perceived time pressure, and impulsive buying behavior in TikTok live-streaming commerce. The sample consists of Generation Z individuals aged 18-29 who have made purchases through TikTok live streams within the past three months, ensuring that participants have recent and relevant experience with the phenomenon under study. A purposive sampling method was applied, with respondents selected based on criteria aligned with the research objectives. A total of 260 valid responses were collected, which is considered adequate for structural equation modeling. This sample size exceeds the minimum requirement of ten observations per indikator (Hair et al., 2021). thereby improving the robustness and stability of the model.

Data were collected conducted a structured online questionnaire distributed through digital platforms targeting active TikTok users. The instrument was divided into two sections: the first captured respondents' demographic information, while the second measured the constructs of interest. All variables were assessed using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The constructs examined in this study include streamer-displayed pleasure, streamer-displayed arousal, customer engagement, perceived time pressure, and impulsive buying behavior. Measurement items were adapted from established studies to ensure content validity and were adjusted to fit the context of TikTok live-streaming. All constructs were modeled as reflective latent variables, consistent with prior research in social commerce and consumer behavior (Brodie et al., 2011).

The data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM), which is suitable for analyzing complex models with predictive purposes, including mediation and moderation effects (Hair et al., 2021). The analysis proceeded in two stages: evaluation of the measurement model and assessment of the structural model. For the measurement model, reliability and validity were examined using

multiple criteria. Internal consistency was evaluated through Cronbach's alpha and composite reliability, with values above 0.70 indicating acceptable reliability. Convergent validity was assessed through outer loadings (≥ 0.70) and average variance extracted (AVE ≥ 0.50), while discriminant validity was examined using the Fornell–Larcker criterion. These results confirm that the measurement model meets established standards of reliability and validity (Hair et al., 2021).

In the structural model evaluation, the explanatory power was assessed using the coefficient of determination (R^2), where higher values indicate stronger predictive ability of the endogenous constructs. Model significance and overall explanatory contribution were further evaluated using the F-test. Hypothesis testing was performed using a bootstrapping to obtain path coefficients, t-statistics, and p-values. The mediating effect of customer engagement was analyzed through indirect effect testing, while the moderating effect of perceived time pressure was examined using an interaction terms. A hypothesis was considered supported if the p-value was below 0.05 (Sarstedt et al., 2022). Overall, this study aims to provide empirical insights into the mechanisms underlying impulsive buying behavior in the context of TikTok live-streaming commerce.

RESULTS AND DISCUSSION

Table 1.
Respondent Characteristics

Variable	Category	Frequency	Percentage
Age	18–20 years	58	22.3%
	21–23 years	82	31.5%
	24–26 years	67	25.8%
	27–29 years	53	20.4%
Gender	Male	104	40.0%
	Female	156	60.0%
Education	High School	102	39.2%
	Diploma (D3)	58	22.3%
	Bachelor (S1)	72	27.7%
	Postgraduate (S2/S3)	28	10.8%
Occupation	Student	68	26.2%
	Private Employee	82	31.5%
	Entrepreneur	56	21.5%
	Freelancer	28	10.8%
	Others	26	10.0%
Average Spending	< IDR 50,000	52	20.0%
	IDR 50,000 – 100,000	110	42.3%
	IDR 100,000 – 200,000	66	25.4%
	> IDR 200,000	32	12.3%
Purchase Frequency	1 time	61	23.5%
	2–3 times	121	46.5%
	4–5 times	52	20.0%
	>5 times	26	10.0%

Source: Questionnaire data

Table 1 presents the demographic characteristics of the respondents involved in this study. The majority of respondents fall within the age range of 21–23 years (31.5%), followed by those aged 24–26 years (25.8%), indicating that the sample is dominated by early adult Generation Z consumers. In terms of gender distribution, female respondents constitute the majority (60.0%), suggesting a higher participation of women in TikTok live-streaming commerce. Regarding educational background, most respondents have completed high school (39.2%) or hold a bachelor's degree (27.7%), reflecting a relatively educated sample. From an occupational perspective, private employees (31.5%) and students (26.2%) represent the largest groups, indicating that the respondents are economically active and digitally engaged. In terms of consumption behavior, most respondents spend between IDR 50,000 and IDR 100,000 during live-streaming sessions (42.3%), while nearly half of the respondents (46.5%) reported making purchases two to three times within the last two months. These findings suggest that TikTok live streaming has become a frequently used shopping channel among Generation Z consumers, supporting its relevance as the context of this study.

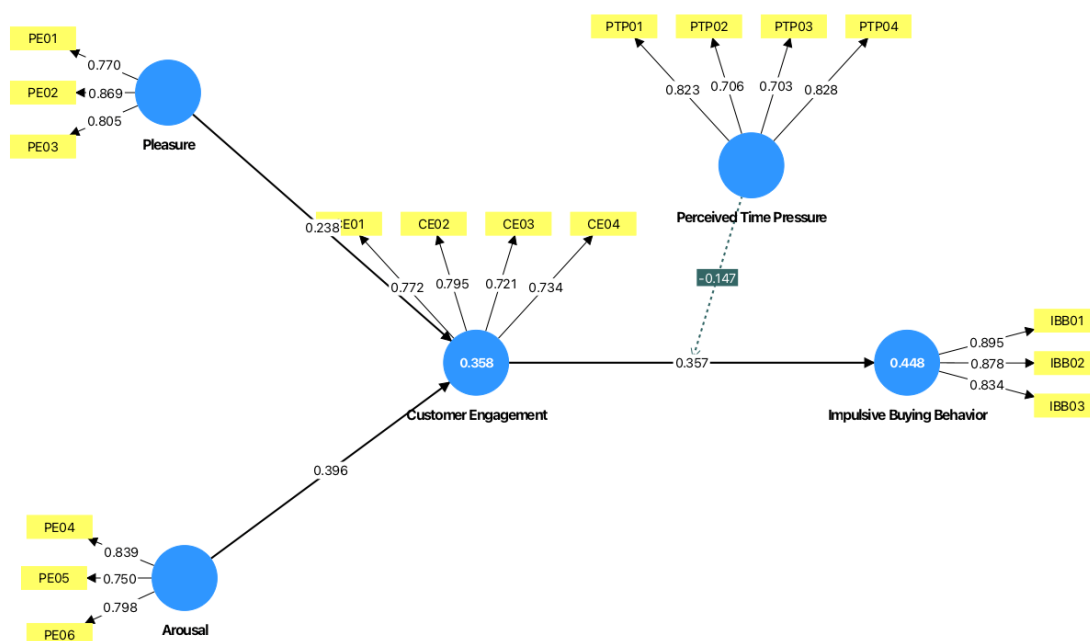


Figure 2.

Structural Model Results of the Proposed Research Framework

Source: Authors' calculation based on survey data (n = 260), analyzed using SmartPLS 4

Table 2.
Measurement Model Assessment: Reliability and Convergent Validity Results

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Arousal	0.715	0.729	0.838	0.634
Customer Engagement	0.752	0.757	0.842	0.572
Impulsive Buying Behavior	0.838	0.840	0.903	0.756
Perceived Time Pressure	0.766	0.783	0.851	0.589
Pleasure	0.748	0.760	0.856	0.665

Source: Authors' calculation based on survey data (n = 260), analyzed using SmartPLS 4

Construct reliability and convergent validity were evaluated using several indicators, including Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE). The results indicate that all constructs meet the acceptable criteria for internal consistency. Cronbach's alpha values range from 0.715 to 0.828, exceeding the commonly suggested threshold of 0.70 (Hair et al., 2021). which reflects satisfactory reliability. In addition, composite reliability scores fall between 0.838 and 0.903, further supporting the consistency of the measurement items. Regarding convergent validity, the AVE values lie between 0.572 and 0.756, all above the minimum benchmark of 0.50. This indicates that each construct accounts for more than half of the variance in its corresponding indicators. Moreover, most outer loadings exceed the recommended threshold of 0.70, although a few items show slightly lower values that remain acceptable, particularly in exploratory research settings. Overall, these results indicate that the measurement model demonstrates adequate reliability and meets the criteria for convergent validity.

Table 3.
Discriminant Validity Assessment Using Cross Loadings

	Arousal	Customer Engagement	Impulsive Buying Behavior	Perceived Time Pressure	Pleasure	Perceived Time Pressure x Customer Engagement
CE01	0.419	0.772	0.296	0.168	0.423	-0.106
CE02	0.480	0.795	0.393	0.193	0.412	-0.094
CE03	0.342	0.721	0.303	0.174	0.342	-0.103
CE04	0.485	0.734	0.371	0.033	0.449	0.013
IBB01	0.251	0.360	0.895	0.466	0.216	-0.213
IBB02	0.264	0.442	0.878	0.486	0.192	-0.198
IBB03	0.253	0.380	0.834	0.466	0.233	-0.177
PE01	0.605	0.380	0.161	0.063	0.770	-0.158

PE02	0.717	0.481	0.273	0.089	0.869	-0.131
PE03	0.557	0.457	0.157	0.028	0.805	-0.087
PE04	0.839	0.497	0.280	0.109	0.628	-0.128
PE05	0.750	0.359	0.188	-0.034	0.582	-0.002
PE06	0.798	0.504	0.227	0.057	0.627	-0.005
PTP01	0.066	0.164	0.497	0.823	0.095	-0.069
PTP02	0.025	0.132	0.362	0.706	-0.005	-0.026
PTP03	0.101	0.142	0.366	0.703	0.080	-0.105
PTP04	0.009	0.123	0.426	0.828	0.045	-0.094
Perceived Time Pressure x Customer Engagement	-0.062	-0.092	-0.226	-0.096	-0.151	1.000

Source: Authors' calculation based on survey data (n = 260), analyzed using SmartPLS 4

Discriminant validity was evaluated using the cross-loading approach, which requires that each indicator exhibits a higher loading on its assigned construct than on other constructs. The findings demonstrate that all indicators load most strongly on their respective constructs, thereby supporting construct distinctiveness. For instance, the indicators of customer engagement (CE01–CE04) show stronger loadings on the customer engagement construct, ranging from 0.721 to 0.795, compared to their loadings on other variables. Likewise, the indicators of impulsive buying behavior (IBB01–IBB03) display the highest loadings on their intended construct, with values ranging from 0.834 to 0.895, further confirming the adequacy of discriminant validity. A similar pattern is observed across the remaining constructs, including pleasure, arousal, and perceived time pressure, where each indicator consistently demonstrates higher loadings on its corresponding construct than on alternative constructs. This indicates that each latent variable captures a distinct conceptual domain within the proposed model. Although some cross-loadings, particularly between pleasure and arousal, appear moderately high, this is theoretically justifiable as both constructs represent related dimensions of positive emotional expression. Importantly, the differences between the primary loadings and cross-loadings remain sufficiently large, indicating that discriminant validity is maintained. Overall, these results provide strong evidence that the measurement model satisfies the criteria for discriminant validity.

Table 4.

Discriminant Validity Assessment Using the Fornell–Larcker Criterion					
	Arousal	Customer Engagement	Impulsive Buying Behavior	Perceived Time Pressure	Pleasure
Arousal	0.796				
Customer Engagement	0.578	0.756			
Impulsive Buying Behavior	0.295	0.455	0.869		

Perceived Time Pressure	0.065	0.183	0.544	0.767	
Pleasure	0.769	0.542	0.245	0.074	0.816

Source: Authors' calculation based on survey data (n = 260), analyzed using SmartPLS 4

Discriminant validity was also assessed using the Fornell–Larcker criterion, which requires that the square root of each construct's average variance extracted (AVE) exceeds its correlations with other constructs. The results shown in Table 3 confirm that this condition is met across all variables. The diagonal values, representing the square root of AVE, are consistently higher than the corresponding inter-construct correlations. For example, the square root of AVE for Arousal (0.796) is greater than its correlations with Customer Engagement (0.578), Impulsive Buying Behavior (0.295), Perceived Time Pressure (0.065), and Pleasure (0.769). The same pattern applies to the remaining constructs, including Customer Engagement (0.756), Impulsive Buying Behavior (0.869), Perceived Time Pressure (0.767), and Pleasure (0.816), where each construct's AVE square root exceeds its correlations with other variables, thereby supporting adequate discriminant validity. Although the correlation between pleasure and arousal (0.769) appears relatively strong, it remains below the square root of AVE for both constructs, indicating that the criterion for discriminant validity is still satisfied. This outcome is theoretically reasonable, as both constructs represent related aspects of positive emotional expression. Overall, the results suggest that all constructs are empirically distinguishable and capture distinct conceptual dimensions, thereby confirming that discriminant validity is adequately established within the measurement model.

Table 5.
Coefficient of Determination (R²) Results

	R-square	R-square adjusted
Customer Engagement	0.358	0.353
Impulsive Buying Behavior	0.448	0.442

Source: Authors' calculation based on survey data (n = 260), analyzed using SmartPLS 4

The predictive strength of the structural model was assessed through the coefficient of determination (R²). The results reported in Table 4 indicate that Customer Engagement achieves an R² value of 0.358 (adjusted R² = 0.353), suggesting that pleasure and arousal expressed by streamers explain approximately 35.8% of its variance. Similarly, Impulsive Buying Behavior shows an R² value of 0.448 (adjusted R² = 0.442), indicating that customer engagement together with perceived time pressure accounts for 44.8% of the variance in this construct. According to the benchmarks proposed by Hair et al. (2021), these values can be categorized as moderate, implying a reasonable level of explanatory capability. Taken together, these findings suggest that the proposed model has adequate predictive power in capturing consumer behavior within TikTok live-streaming commerce.

Table 6.
Effect Size (f²) Results

	Customer Engagement	Impulsive Buying Behavior
Arousal	0.100	

Customer Engagement	0.222
Perceived Time Pressure	0.375
Pleasure	0.036
Perceived Time Pressure x Customer Engagement	0.039

Source: Authors' calculation based on survey data (n = 260), analyzed using SmartPLS 4

The effect size (f^2) was examined to determine the relative contribution of each exogenous variable to the endogenous constructs. As presented in Table 5, the influence of arousal on customer engagement ($f^2 = 0.100$) and pleasure on customer engagement ($f^2 = 0.036$) can be classified as small effects, indicating that both variables provide a limited yet meaningful contribution to explaining variations in customer engagement. In comparison, customer engagement shows a moderate effect on impulsive buying behavior ($f^2 = 0.222$), suggesting that it plays an important role in shaping consumers' spontaneous purchasing decisions. Additionally, perceived time pressure exhibits a relatively strong effect on impulsive buying behavior ($f^2 = 0.375$), highlighting its significance as a key factor in accelerating impulsive purchasing within live-streaming environments. Meanwhile, the interaction effect between perceived time pressure and customer engagement ($f^2 = 0.039$) is categorized as small, indicating that although the moderating effect is present, its overall impact is relatively weak. Based on the criteria proposed by Hair et al. (2021), these results suggest that the model demonstrates a combination of small to moderate effect sizes, with perceived time pressure emerging as the most influential predictor of impulsive buying behavior.

Table 7.
Structural Model Results and Hypothesis Testing

Path	Original Sample (O)	Sample Mean (M)	STDEV	T Statistics	P Values
Pleasure → Customer Engagement	0.238	0.238	0.080	2.954	0.003
Arousal → Customer Engagement	0.396	0.399	0.080	4.960	0.000
Customer Engagement → Impulsive Buying Behavior	0.357	0.356	0.048	7.492	0.000
Arousal → Customer Engagement → Impulsive Buying Behavior	0.141	0.143	0.038	3.680	0.000
Pleasure → Customer Engagement → Impulsive Buying Behavior	0.085	0.084	0.029	2.920	0.004
Time Pressure × Customer	-0.147	-0.146	0.050	2.951	0.003

Engagement →
Impulsive Buying
Behavior

Source: Authors' calculation based on survey data (n = 260), analyzed using SmartPLS 4

The findings indicate that pleasure has a positive and significant effect on customer engagement (H1) ($\beta = 0.238$, $t = 2.954$, $p = 0.003$). This result suggests that when streamers display pleasant emotions such as friendliness, warmth, and enjoyment, audiences tend to feel more comfortable and psychologically connected to the live-streaming environment, which enhances their willingness to interact and participate. From a theoretical standpoint, this finding aligns with the Stimulus–Organism–Response (S-O-R) framework, where positive emotional cues function as stimuli that shape internal psychological states. However, the relatively moderate effect size indicates that although pleasure contributes to engagement, it does not serve as the primary driver. This implies that while maintaining a positive and enjoyable atmosphere is essential, it may not be sufficient to sustain high levels of engagement without being complemented by more stimulating or attention-grabbing elements. In the context of TikTok live commerce, this suggests that streamers who rely solely on pleasant communication styles without incorporating dynamic interaction may struggle to fully capture audience attention.

The results further reveal that arousal has a positive and significant effect on customer engagement (H2) ($\beta = 0.396$, $t = 4.960$, $p = 0.000$), with a stronger magnitude compared to pleasure. This finding indicates that high levels of excitement, enthusiasm, and energetic delivery by streamers play a more dominant role in attracting audience attention and fostering active engagement. Arousal stimulates consumers' psychological alertness and increases their level of involvement, making them more responsive to live-streaming content. This supports previous research suggesting that high-arousal stimuli are more effective in dynamic digital environments where attention competition is intense. In practical terms, this implies that streamers who demonstrate expressive communication, fast-paced interaction, and high energy levels are more likely to create engaging experiences that encourage viewers to stay longer and participate more actively. Therefore, arousal can be considered a critical factor in differentiating successful live-streaming sessions from less effective ones.

The analysis also confirms that customer engagement has a positive and significant effect on impulsive buying behavior (H3) ($\beta = 0.357$, $t = 7.492$, $p = 0.000$). This result indicates that consumers who are more cognitively, emotionally, and behaviorally involved in the live-streaming experience are more likely to engage in spontaneous and unplanned purchases. High engagement levels reduce consumers' reliance on rational evaluation and increase their emotional attachment to the content, thereby facilitating impulsive decision-making. This finding reinforces the central role of customer engagement as the "organism" in the S-O-R framework, acting as a crucial mechanism that translates external stimuli into behavioral responses. In the context of TikTok live commerce, this suggests that creating interactive and immersive experiences is essential for stimulating purchasing behavior. Consumers who actively participate in discussions, respond to streamer cues, and remain attentive during live sessions are more likely to convert their engagement into actual purchase decisions.

The mediation analysis reveals that customer engagement significantly mediates the relationship between arousal and impulsive buying behavior (H4) ($\beta = 0.141$, $t = 3.680$, $p = 0.000$). This finding indicates that the effect of arousal on impulsive buying is largely indirect and operates through increased engagement. In other words, the excitement and energy displayed by streamers do not directly trigger purchasing behavior; instead, they first enhance audience engagement, which subsequently leads to impulsive buying. This highlights the importance of engagement as a transmission mechanism that converts emotional stimuli into behavioral outcomes. The result also suggests that without sufficient engagement, the impact of arousal on purchasing behavior may be limited. Therefore, streamers must not only create excitement but also ensure that such excitement translates into meaningful interaction with the audience.

Similarly, the results show that customer engagement significantly mediates the relationship between pleasure and impulsive buying behavior (H5) ($\beta = 0.085$, $t = 2.920$, $p = 0.004$). This suggests that the influence of pleasure on impulsive buying is primarily indirect, functioning through its ability to enhance engagement rather than directly triggering purchase decisions. Compared to arousal, the mediating effect of pleasure is weaker, indicating that pleasant emotional expressions contribute to engagement but may not strongly drive purchasing behavior unless combined with more stimulating factors. This finding emphasizes that while positive emotions are important, their effectiveness in driving impulsive buying depends on their ability to generate deeper engagement. Thus, engagement remains the key pathway through which emotional displays influence consumer behavior.

Finally, the moderating analysis indicates that perceived time pressure significantly moderates the relationship between customer engagement and impulsive buying behavior (H6) ($\beta = -0.147$, $t = 2.951$, $p = 0.003$). Interestingly, the effect is negative, suggesting that higher levels of perceived time pressure weaken the positive relationship between engagement and impulsive buying. This finding contrasts with conventional assumptions that time pressure enhances impulsive behavior by creating urgency. Instead, the result implies that excessive time pressure may lead to cognitive overload, stress, or discomfort, which can reduce consumers' willingness to act impulsively despite being engaged. In the context of TikTok live commerce, this suggests that overly aggressive urgency tactics, such as constant countdowns or pressure to make immediate decisions, may backfire and reduce conversion rates. Therefore, time pressure should be applied strategically and balanced with a comfortable decision-making environment to maintain its effectiveness.

CONCLUSION

This study investigates the impact of positive emotional expressions displayed by streamers—specifically pleasure and arousal on impulsive buying behavior in TikTok live-streaming commerce. Customer engagement is positioned as a mediating variable, while perceived time pressure functions as a moderating factor. The results indicate that both pleasure and arousal significantly enhance customer engagement, with arousal showing a stronger influence. This suggests that more dynamic and stimulating emotional expressions are particularly effective in attracting audience attention and encouraging interaction. Furthermore, customer engagement is found to have a significant positive effect on impulsive buying behavior, highlighting its role as a key psychological mechanism that translates emotional stimuli into purchasing actions. Although pleasure also has a direct

effect on impulsive buying, its influence is relatively weaker, implying that its impact is more substantial when mediated through engagement. Interestingly, perceived time pressure exhibits a significant but negative moderating effect, indicating that excessive time pressure may reduce the strength of the relationship between engagement and impulsive buying. This finding suggests that while time pressure can create a sense of urgency, it may also lead to cognitive discomfort, thereby discouraging impulsive purchase decisions. Overall, this study contributes to the extension of the Stimulus–Organism–Response (S-O-R) framework by emphasizing the importance of streamer-displayed emotions as external stimuli and highlighting customer engagement as a critical mediating mechanism in live-streaming commerce.

REFERENCES

- Brodie, R. J., Hollebeek, L. D., Juric, B., & Ilic, A. (2011). Customer engagement: Conceptual domain, fundamental propositions, and implications for research. *Journal of Service Research*, 14(3), 252–271. <https://doi.org/10.1177/1094670511411703>
- Center, K. I. (2025). *[Lengkapi judul survei/riset Katadata Insight Center 2025 tentang live shopping]*. Katadata Insight Center.
- Chen, C.-C., & Lin, Y.-C. (2018). What Drives Live-Stream Usage Intention? The Perspectives of Flow, Entertainment, Social Interaction, and Endorsement. *Telematics and Informatics*, 35(1), 293–303. <https://doi.org/10.1016/j.tele.2017.12.003>
- DataReportal. (2024). *Digital 2024: Indonesia*. We Are Social & Meltwater. <https://datareportal.com/reports/digital-2024-indonesia>
- Dhar, R., & Nowlis, S. M. (1999). The Effect of Time Pressure on Consumer Choice Deferral. *Journal of Consumer Research*, 25(4), 369–384. <https://doi.org/10.1086/209545>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. SAGE Publications.
- Hollebeek, L. D., Clark, M. K., & Macky, K. (2021). Customer Engagement: A Review and Research Agenda. *Journal of Service Research*, 24(2), 166–187. <https://doi.org/10.1177/1094670520957425>
- Isbahi, M. B., Zuana, M. M. M., & Toha, M. (2024). The Multi-Social Relation of the Cattle Industry in the Plaosan Subdistrict Animal Market of Magetan Regency. *Malacca: Journal of Management and Business Development*, 1(1), 31–46. <https://doi.org/10.69965/malacca.v1i1.51>
- Luo, X., C., J. H., Hollebeek, L. D., & Lim, X. J. (2024). Boosting customers' impulsive buying tendency in live-streaming commerce. *Journal of Retailing and Consumer Services*. <https://doi.org/10.1016/j.jretconser.2023.103644>
- Ma, L., Chen, X., & Luo, X. (2024). Social Presence, Parasocial Interaction, and Consumer Trust in Live Streaming Commerce. *Computers in Human Behavior*, 150, 107982. <https://doi.org/10.1016/j.chb.2023.107982>
- Mehrabian, A., & Russell, J. A. (1974). *An Approach to Environmental Psychology*.
- Mingwei, L., Zhang, Y., & Chen, X. (2022). The Role of Positive Emotion in Live Streaming Commerce: Evidence from Consumer Engagement and Purchase Behavior. *Journal of Retailing and Consumer Services*, 68, 103045. <https://doi.org/10.1016/j.jretconser.2022.103045>

- Sarstedt, M., Ringle, C. M., & Hair, J. F. (2022). Partial Least Squares Structural Equation Modeling. In *Handbook of Market Research* (pp. 1–47). https://doi.org/10.1007/978-3-319-57413-4_15
- Sun, Y., Shao, X., Li, X., Guo, Y., & Nie, K. (2023). Understanding Live Streaming Commerce: The Role of Streamer Trust and Perceived Value on Purchase Intention. *Electronic Commerce Research and Applications*, 58, 101228. <https://doi.org/10.1016/j.elerap.2023.101228>
- Wei, D., Zhang, H., & Li, J. (2022). Perceived Time Pressure and Impulse Buying in Live Streaming Commerce: A Moderated Mediation Model. *Internet Research*, 32(7), 2150–2172. <https://doi.org/10.1108/INTR-03-2022-0128>
- Wongkitrungrueng, A., & Assarut, N. (2020). The Role of Live Streaming in Building Consumer Trust and Engagement with Social Commerce Sellers. *Journal of Business Research*, 117, 543–556.
- Zhang, R., L., X., & Li, Y. (2023). The impact of streamer-audience interaction on customer engagement in live commerce. *Journal of Retailing and Consumer Services*. <https://doi.org/10.1016/j.jretconser.2022.103164>
- Zhang, X., Li, B., & Wang, Y. (2022). Time Pressure and Impulse Buying in Live Streaming Commerce. *Electronic Commerce Research*, 22(3), 845–867. <https://doi.org/10.1007/s10660-021-09489-7>