

The Stimulus-Organism-Response (S-O-R) Model In Tiktok Shop Live Commerce: The Effects Of Scarcity And Flash Sale Characteristics On Attitude And Impulse Buying

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Abstract

Flash sales have become a prominent marketing strategy on live streaming commerce platforms such as TikTok Shop to stimulate spontaneous consumer purchases. Drawing on the Stimulus–Organism–Response (SOR) framework, this study examines the effects of scarcity cues (limited quantity and limited time) and flash sale characteristics (information, visuality, and entertainment) on consumer attitude and impulse buying behavior. A quantitative approach was employed using data collected from 300 active TikTok Shop users in Indonesia through an online survey. The data were analyzed using Covariance-Based Structural Equation Modeling (CB-SEM) with LISREL software. The results reveal that limited quantity and information significantly influence both consumer attitude and impulse buying, exerting effects both directly and indirectly. Visuality and entertainment significantly enhance attitude but affect impulse buying only indirectly through attitude. In contrast, limited time shows no significant effect on either attitude or impulse buying. Attitude plays a central mediating role in translating flash sale stimuli into impulsive purchase behavior. These findings highlight the differentiated effectiveness of various promotional stimuli in live streaming commerce and affirm the applicability of the SOR model in explaining impulse buying within video-based social commerce environments. The study provides practical implications for TikTok Shop sellers and platform managers in designing more effective flash sale strategies, particularly by emphasizing limited quantity and high-quality product information while reconsidering the use of time-limited promotions.

Keywords: Flash sale, Scarcity, Live streaming commerce, Impulse buying, Attitude, TikTok Shop, Stimulus-Organism-Response (SOR)

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IJEBIR, Volume 05 Issue 04, 2026



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INTRODUCTION

The rapid expansion of digital technologies has fundamentally transformed consumer behavior and commercial transactions worldwide. In Indonesia, the convergence of high internet penetration, widespread smartphone adoption, and the proliferation of digital payment systems has accelerated the shift from traditional to online purchasing (Lamis et al., 2022). This transformation has positioned Indonesia as one of the fastest-growing e-commerce markets globally, with the digital economy reaching approximately US\$99 billion in 2025, of which e-commerce contributed around US\$71 billion or roughly 72% of the total (Ahdiat, 2025). Within this ecosystem, social commerce platforms that integrate social interaction with transactional features have emerged as a distinct and rapidly expanding segment, differentiating themselves from conventional e-commerce marketplaces that primarily emphasize product search and catalog browsing (Lin & Wang, 2023)

TikTok Shop exemplifies this evolution of social commerce through its content-driven model. Unlike traditional e-commerce platforms, TikTok Shop embeds commercial activities within entertainment content, live streaming, and short-form videos, enabling consumers to discover products serendipitously while engaging with creators and sellers in real time (M. Gong & Liu, 2025; X. Gong & Jiang, 2023). Indonesia has become the second-largest market for TikTok Shop globally, recording a Gross Merchandise Value (GMV) of US\$6.2 billion in 2024, with year-over-year growth of 39% (Bloomberg, 2025a). This remarkable growth reflects not only increasing digital literacy but also the platform's ability to create immersive shopping experiences that blend information, visual appeal, and entertainment. As competition intensifies, platforms and sellers increasingly rely on time-limited promotional strategies, particularly flash sales, to stimulate immediate purchases (Ahdiat, 2025; Ridwan, 2025)

Flash sales on TikTok Shop are characterized by a combination of scarcity cues, limited time and limited quantity, and distinctive live commerce features, including real-time product information, dynamic visual presentation, and entertainment elements delivered through live streaming (Lamis et al., 2022; Nguyen-Van et al., 2024). These characteristics create a unique stimulus environment in which consumers are simultaneously exposed to promotional urgency, rich visual demonstrations, interactive communication, and entertaining content. Prior research suggests that such stimuli can trigger emotional and cognitive responses that facilitate impulse buying, defined as spontaneous purchases made without prior planning or intention (Akram et al., 2018; Verhagen & Van Dolen, 2011).

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IJEBIR, Volume 05 Issue 04, 2026

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The Stimulus–Organism–Response (SOR) framework provides a robust theoretical lens for understanding this process. According to the SOR model, external stimuli influence an individual's internal cognitive and affective states (organism), which in turn shape behavioral responses (Chan et al., 2017; Manthiou et al., 2017). In the context of TikTok Shop flash sales, stimuli such as limited time, limited quantity, information quality, visuality, and entertainment are expected to shape consumers' attitudes toward the promotion, subsequently affecting their tendency to engage in impulse buying. This theoretical perspective has been widely applied in impulse buying research because it effectively captures both the external marketing stimuli and the internal psychological mechanisms that mediate consumer responses (Li et al., 2023; Sun et al., 2023).

Empirical studies have consistently demonstrated positive relationships between scarcity cues and impulse buying in online environments. Limited time and limited quantity promotions have been shown to increase perceived urgency and arousal, thereby elevating impulse purchase intentions (Akram et al., 2018; Andrade et al., 2025; Dsilva & Elangovan, 2021; F. Liu et al., 2025; Wu et al., 2021). Similarly, the informational, visual, and entertainment dimensions of live commerce have been found to enhance positive attitudes, which subsequently drive impulsive behavior (X. Gong & Jiang, 2023; Lamis et al., 2022; Li et al., 2024). However, findings are not entirely uniform. Some studies report that excessive time pressure or information overload may weaken or even reverse these effects when consumers experience skepticism or fatigue (Sun et al., 2023; Zhu et al., 2020). Moreover, the majority of existing research has been conducted in the contexts of conventional e-commerce or live streaming commerce in China and Vietnam, with limited attention to the specific dynamics of TikTok Shop in Indonesia, a market characterized by distinct consumer characteristics, high mobile engagement, and rapid adoption of short-video social commerce (F. Liu et al., 2025; Nguyen-Van et al., 2024).

This gap is particularly salient given TikTok Shop's distinctive integration of scarcity tactics with live interactive and entertainment features. While scarcity theory and the SOR framework offer general explanations, the simultaneous effects of limited time, limited quantity, information, visuality, and entertainment on consumer attitude and impulse buying within Indonesia's TikTok Shop environment remain underexplored. Addressing this gap is important for both theory and practice. Theoretically, the study extends the application of the SOR model to an emerging live social commerce context in a major emerging market. Practically, findings can inform platform operators and sellers



in designing more effective flash sale strategies that balance urgency with positive consumer experience.

Accordingly, this study investigates the influence of flash sale characteristics on consumer attitude and impulse buying on TikTok Shop in Indonesia. Specifically, it addresses the following research questions: (1) Do limited quantity, limited time, information, visuality, and entertainment influence consumer attitude on TikTok Shop Indonesia? (2) Does consumer attitude influence impulse buying on TikTok Shop Indonesia? (3) Do limited quantity, limited time, information, visuality, and entertainment influence impulse buying.

The remainder of this paper is organized as follows. Section 2 reviews the relevant literature and develops the research hypotheses. Section 3 describes the research methodology. Section 4 presents the empirical results. Section 5 discusses the findings, theoretical and managerial implications, limitations, and directions for future research.

Literature review and hypothesis

Flash Sales in Social Commerce Platforms

Flash sales represent a promotional strategy in which products are offered at discounted prices for a limited time and in limited quantities (Andrade et al., 2025; X. Liu et al., 2021). In social commerce environments, particularly live streaming platforms such as TikTok Shop, flash sales have evolved beyond simple price discounts into immersive experiences that combine scarcity cues with real-time interaction, visual demonstration, and entertainment (Lamis et al., 2022; Nguyen-Van et al., 2024). Unlike conventional e-commerce marketplaces that emphasize product search and comparison, social commerce platforms integrate social and entertainment elements into the purchasing process, making flash sales more experiential and emotionally driven (X. Gong & Jiang, 2023; Lin & Wang, 2023).

In the Indonesian context, TikTok Shop has rapidly emerged as a dominant social commerce platform, with its flash sale features characterized by countdown timers, limited stock notifications, live demonstrations, and interactive host communication creating a distinctive stimulus environment. These characteristics differentiate TikTok Shop flash sales from traditional marketplace promotions and potentially amplify their influence on consumer decision-making processes (Bloomberg, 2025b)



Impulse Buying in Digital Commerce

Impulse buying refers to spontaneous purchases made without prior planning or intention, often triggered by external stimuli and internal emotional states (Akram et al., 2018; Verhagen & Van Dolen, 2011). In online and social commerce environments, impulse buying occurs more frequently than in offline settings due to the absence of temporal and spatial constraints, continuous exposure to promotional stimuli, and reduced cognitive deliberation (Chan et al., 2017; Wu et al., 2021).

Previous studies have identified both internal factors (e.g., impulsive buying tendency, hedonic motivation) and external factors (e.g., promotional cues, platform characteristics) as significant antecedents of impulse buying (Chen et al., 2019; Zhu et al., 2020). In live social commerce, external stimuli such as scarcity messages, visual presentation, and entertainment content are particularly influential because they simultaneously affect consumers' cognitive and affective states (Li et al., 2024; Sun et al., 2023).

Theoretical Framework: Stimulus-Organism-Response (SOR) Model

This study adopts the Stimulus–Organism–Response (SOR) framework to explain how external marketing stimuli influence internal consumer states and subsequent behavior (Chan et al., 2017; Russell & Mehrabian, 1974). In the SOR model, stimulus refers to environmental cues that individuals encounter; organism represents internal cognitive and affective processes that mediate the relationship between stimulus and response; and response denotes the resulting behavioral outcome (F. Liu et al., 2025).

In the context of TikTok Shop flash sales, the stimulus construct encompasses scarcity cues (limited time and limited quantity) and flash sale characteristics (information, visuality, and entertainment). The organism is represented by attitude toward the flash sale, reflecting consumers' overall evaluation of the promotional offer. The response is operationalized as impulse buying behavior. The SOR framework is particularly appropriate for this study because flash sale consumption on live commerce platforms involves both rational evaluation and emotional engagement, which attitude effectively captures as an internal mediating state (Lamis et al., 2022; Manthiou et al., 2017).

Hypothesis Development

The Influence of Scarcity on Consumer Attitude

Scarcity theory posits that individuals assign higher value to objects perceived as limited or difficult to obtain (Cialdini & Goldstein, 2004). In flash sales, scarcity is



operationalized through limited quantity and limited time, both of which function as external stimuli that heighten perceived exclusivity and urgency. Within the SOR framework, these scarcity cues are expected to trigger more favorable internal evaluations of the promotional offer. Limited quantity creates a perception that the product is in high demand and exclusive, thereby enhancing consumers' positive assessment of the deal (Vannisa et al., 2020; Wu et al., 2021). Similarly, limited time generates temporal pressure that accelerates and positively biases the evaluation process (X. Gong & Jiang, 2023; M. Zhang et al., 2018). Empirical evidence from online promotion and live commerce contexts consistently supports the positive effect of scarcity on consumer attitude (Feng et al., 2024; Li et al., 2023). Therefore, the following hypotheses are proposed:

H1a: Limited quantity has a significant positive effect on consumer attitude toward flash sales on TikTok Shop Indonesia.

H1b: Limited time has a significant positive effect on consumer attitude toward flash sales on TikTok Shop Indonesia.

The Influence of Flash Sale Characteristics on Consumer Attitude

Beyond scarcity, the manner in which flash sales are presented through information, visuality, and entertainment also serves as critical stimuli in live social commerce. These characteristics shape consumers' cognitive and affective evaluations of the promotional experience. High-quality information delivered via live streaming reduces uncertainty and facilitates positive product assessment (Chen et al., 2019; X. Gong & Jiang, 2023). Visuality, encompassing attractive product presentation and dynamic visual content, enhances perceived appeal and emotional engagement, particularly on video-centric platforms (Akram et al., 2018; Lamis et al., 2022). Entertainment, derived from interactive and enjoyable live streaming experiences, fosters positive affective responses toward the promotion (Li et al., 2024; F. Liu et al., 2025). Prior research in social commerce and flash sale contexts has confirmed that these three characteristics positively influence consumer attitude (Nguyen-Van et al., 2024). Accordingly, the following hypotheses are formulated:

H2a: Information has a significant positive effect on consumer attitude toward flash sales on TikTok Shop Indonesia.

H2b: Visuality has a significant positive effect on consumer attitude toward flash sales on TikTok Shop Indonesia.



H2c: Entertainment has a significant positive effect on consumer attitude toward flash sales on TikTok Shop Indonesia.

The Influence of Attitude on Impulse Buying

According to the Theory of Reasoned Action, attitude toward a behavior is a primary determinant of behavioral intention and actual behavior (Ajzen & Fishbein, 1980). In the SOR framework, attitude functions as the organism that translates external stimuli into behavioral responses. A favorable attitude toward a flash sale is expected to increase the likelihood of spontaneous purchasing decisions. Empirical studies in e-commerce and live streaming contexts have consistently demonstrated a positive relationship between attitude and impulse buying (Chen et al., 2019; Li et al., 2023; Sun et al., 2023). When consumers develop a positive overall evaluation of a flash sale promotion, they are more inclined to act impulsively without extensive deliberation (Lamis et al., 2022; Nguyen-Van et al., 2024). Thus, the following hypothesis is proposed:

H3: Consumer attitude has a significant positive effect on impulse buying on TikTok Shop Indonesia.

The Influence of Scarcity on Impulse Buying

Scarcity cues can also exert a direct effect on impulse buying by narrowing consumers' decision-making window and increasing psychological pressure to act immediately (Akram et al., 2018; Luo et al., 2021). Limited quantity intensifies perceived competition among buyers, while limited time creates temporal urgency that reduces opportunities for rational evaluation (Sun et al., 2023; J. Zhang et al., 2022). In live commerce environments, real-time notifications of dwindling stock and countdown timers further amplify these effects. Previous research has found direct positive relationships between scarcity dimensions and impulse buying in both e-commerce and social commerce settings (Chen et al., 2019; Hongsuchon et al., 2025). Therefore, the following hypotheses are advanced:

H4a: Limited quantity has a significant positive effect on impulse buying on TikTok Shop Indonesia.

H4b: Limited time has a significant positive effect on impulse buying on TikTok Shop Indonesia.



The Influence of Flash Sale Characteristics on Impulse Buying

Flash sale characteristics may also directly influence impulse buying by enhancing the overall attractiveness and experiential quality of the promotional encounter. Informative, visually appealing, and entertaining live streaming content can create immersive experiences that lower cognitive resistance and heighten spontaneous purchasing tendencies (X. Liu et al., 2021; Ryu & Ryu, 2021). Studies in livestreaming and social commerce have shown that information quality, visual presentation, and entertainment value can directly stimulate impulse buying, in addition to their indirect effects through attitude (Chan et al., 2017; X. Gong & Jiang, 2023; Lamis et al., 2022). Hence, the following hypotheses are proposed:

H5a: Information has a significant positive effect on impulse buying on TikTok Shop Indonesia.

H5b: Visuality has a significant positive effect on impulse buying on TikTok Shop Indonesia.

H5c: Entertainment has a significant positive effect on impulse buying on TikTok Shop Indonesia.

Research methods

Research Design and Data Collection

This study adopts a quantitative approach with a conclusive descriptive research design to examine the influence of flash sale characteristics on consumer attitude and impulse buying behavior on TikTok Shop in Indonesia. Data were collected using a single cross-sectional online survey distributed through Google Forms. The questionnaire was disseminated via social media platforms and messaging applications (WhatsApp, Telegram, Instagram, and X) to reach TikTok Shop users across various regions in Indonesia.

A purposive sampling technique was employed. Respondents were required to meet the following criteria: (1) aged 17 years or older, (2) possessed a TikTok account and had accessed the TikTok Shop feature, and (3) had made at least one purchase through the flash sale feature on TikTok Shop within the past three months. These criteria ensured that respondents had direct experience with the scarcity cues and live commerce stimuli under investigation. Data collection was conducted over a four-week period, yielding 280 valid responses. This sample size meets the recommended minimum of 10 observations per indicator for covariance-based structural equation modeling (Hair et al., 2021), given that the model comprises 28 indicators across seven constructs.

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Measures

The questionnaire consisted of two sections. The first section captured demographic characteristics and flash sale usage behavior. The second section measured seven latent constructs using multi-item scales adapted from prior studies. All items were measured on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). The operational definitions and sources of the indicators are presented in Table 3.1.

Table 3.1. Operational Definitions of Constructs

Construct	Number of Items	Source	Description
Limited Quantity	4	Agrawal & Sareen (2016); Lamis et al. (2022)	Perceptions of product scarcity due to limited stock
Limited Time	4	Eisenbeiss et al. (2015); Lamis et al. (2022)	Perceptions of time pressure during flash sales
Information	4	X. Gong & Jiang (2023); Lamis et al. (2022)	Completeness, accuracy, and relevance of product information
Visuality	4	Bhandari et al. (2019); Lamis et al. (2022)	Attractiveness of visual presentation and design
Entertainment	4	Lamis et al. (2022); Loureiro et al. (2019)	Enjoyment and entertainment value of live streaming
Attitude	4	Akroush & Al-Debei (2015); Lamis et al. (2022)	Overall evaluation of flash sale promotions
Impulse Buying	4	Chan et al. (2017); Lamis et al. (2022)	Spontaneous and unplanned purchases during flash sales

Source: Authors compiled (2026)



Prior to main data collection, a readability test was conducted with eight qualified respondents to ensure clarity of the questionnaire items. Minor revisions were made based on their feedback.

Data Analysis

Data were analyzed using Covariance-Based Structural Equation Modeling (CB-SEM) with LISREL 8.80 software. CB-SEM was selected because the study aims to confirm a theoretically derived model based on the Stimulus–Organism–Response (SOR) framework and to simultaneously test multiple causal relationships among latent constructs (Hair et al., 2021; Wijanto, 2020). The analysis procedure followed four main stages. First, the measurement model was evaluated to assess reliability and validity. Indicator reliability was examined through standardized factor loadings (acceptable if ≥ 0.50) and t-values (significant if ≥ 1.96). Convergent validity was assessed using Average Variance Extracted ($AVE \geq 0.50$). Discriminant validity was evaluated using the Fornell-Larcker criterion, whereby the square root of AVE for each construct must exceed its correlations with other constructs. Internal consistency reliability was tested using Cronbach's alpha and Composite Reliability, with values above 0.70 considered acceptable (Hair et al., 2021). Second, the overall model fit was assessed using multiple goodness-of-fit indices, including absolute fit measures (GFI, RMSEA, RMR), incremental fit measures (CFI, NFI, TLI), and parsimonious fit measures (PNFI, AGFI). A model was considered to have acceptable fit when most indices met or exceeded conventional thresholds (e.g., $RMSEA \leq 0.08$, $CFI \geq 0.90$). Third, the structural model was examined by evaluating the path coefficients and their statistical significance. A hypothesized relationship was supported if the t-value of the path coefficient was greater than or equal to 1.96 ($\alpha = 0.05$). The coefficient of determination (R^2) for endogenous constructs was also reported to indicate the proportion of variance explained by the model. This analytical approach enables a comprehensive evaluation of both the measurement quality and the structural relationships proposed in the research model.

Result

Respondent Demographics

A total of 315 questionnaires were collected through an online survey. After screening for completeness and adherence to the purposive sampling criteria (aged 17 years or older, active TikTok Shop user, and had made at least one flash sale purchase in the past three months), 300 valid responses were retained for analysis.

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IJEBIR, Volume 05 Issue 04, 2026

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Table 4.1. Respondents' Demographics

Demographics	Category	Number of Respondents	Percentage
Gender	Women	195	65.0%
	Men	105	35.0%
Age	17–25 years	267	89.0%
	26–35 years	29	9.7%
	> 35 years	4	1.3%
Region	West Indonesia (Java, Sumatra, Kalimantan)	234	78.0%
	Central Indonesia	42	14.0%
	East Indonesia	24	8.0%
Education	Bachelor's degree or higher	260	86.7%
	Senior high school or below	40	13.3%
Occupation	Student	210	70.0%
	Private employee	36	12.0%
	Civil servant (PNS)	23	7.7%
	Entrepreneur	18	6.0%
	Others	13	4.3%
Monthly Income	< IDR 3 million	221	73.7%
	IDR 3–5 million	39	13.0%
	> IDR 5 million	40	13.3%

Source: Data processed (2026)

The demographic profile of the respondents indicates that the majority were women (65.0%), aged 17–25 years (89.0%), resided in West Indonesia (78.0%), held at least a bachelor's degree (86.7%), were students (70.0%), and had monthly income below IDR 3 million (73.7%). This profile aligns with previous findings that women and younger consumers, particularly Generation Z, exhibit higher levels of impulse buying behavior on social commerce platforms due to greater emotional responsiveness to visual stimuli, entertainment content, and scarcity cues in live streaming (Djafarova & Bowes, 2021; Huang et al., 2024; Singh et al., 2023). The dominance of students and lower-to-



middle income groups is also consistent with studies showing that these segments are more susceptible to flash sale promotions because of higher price sensitivity and intensive exposure to digital content (Lamis et al., 2022; Ngo et al., 2025; Phan et al., 2024). Although the sample is concentrated in West Indonesia, it reflects the current distribution of e-commerce activity in the country, where digital infrastructure and online shopping intensity remain highest.

Measurement Model

The measurement model was evaluated to assess the reliability and validity of the reflective constructs using covariance-based SEM with LISREL 8.80. Convergent validity was examined through standardized factor loadings, t-values, and Average Variance Extracted (AVE). As shown in Table 2, all standardized loadings exceeded the threshold of 0.50 except for VS4 (0.41). However, all constructs achieved AVE values above 0.50, indicating that the indicators collectively explained more than 50% of the variance in their respective constructs (Hair et al., 2021). All t-values were well above 1.96, confirming statistical significance.

Table 4.2. Convergent Validity and Reliability Results

Construct	Item	Loading	t-value	AVE	Cronbach's α	Composite Reliability	Result
Impulse Buying (IMB)	IMB1–4	0.60–0.74	9.30–11.34	0.71	0.76	0.77	Valid & Reliable
Attitude (ATT)	ATT1–4	0.76–0.88	10.30–16.61	0.65	0.88	0.88	Valid & Reliable
Limited Quantity (LQ)	LQ1–4	0.55–0.89	9.79–18.68	0.59	0.84	0.85	Valid & Reliable
Limited Time (LT)	LT1–4	0.56–0.84	9.70–16.26	0.53	0.80	0.81	Valid & Reliable
Information (INF)	INF1–4	0.50–0.75	8.10–12.63	0.51	0.71	0.72	Valid & Reliable
Visuality (VS)	VS1–4	0.41–0.79	6.57–13.33	0.52	0.70	0.72	Valid & Reliable
Entertainment (INT)	INT1–4	0.55–0.81	9.09–14.48	0.51	0.73	0.73	Valid & Reliable

Source: Data processed (2026)

Discriminant validity was assessed using the Fornell-Larcker criterion. The square root of AVE for each construct exceeded its correlations with other constructs, and no inter-construct correlations approached or exceeded 0.85, indicating adequate discriminant validity and the absence of serious multicollinearity (Hair et al., 2021).



Structural Model and Goodness of Fit

The structural model was evaluated after confirming acceptable measurement properties. The overall model fit was assessed using multiple indices. As presented in Table 3, the model demonstrated good fit across absolute, incremental, and parsimonious measures. The Chi-square value was 813.24 ($df = 329$, $p < 0.001$), with RMSEA = 0.070, GFI = 0.91, CFI = 0.93, and NFI = 0.91, all meeting or exceeding recommended thresholds (Hair et al., 2021). These results indicate that the hypothesized model adequately represents the observed data.

Table 4.3. Goodness-of-Fit Indices

Fit Measure	Threshold	Result	Conclusion
Absolute Fit			
GFI	≥ 0.90	0.91	Good fit
RMR	≤ 0.05	0.028	Good fit
RMSEA	≤ 0.08	0.070	Good fit
Incremental Fit			
NFI	≥ 0.90	0.91	Good fit
RFI	≥ 0.90	0.92	Good fit
CFI	≥ 0.90	0.93	Good fit
AGFI	≥ 0.50	0.80	Good fit
Parsimonious Fit			
PNFI	≥ 0.50	0.78	Good fit

Source: Data processed (2026)



The structural model with standardized path coefficients and t-values is presented in Figure 1.

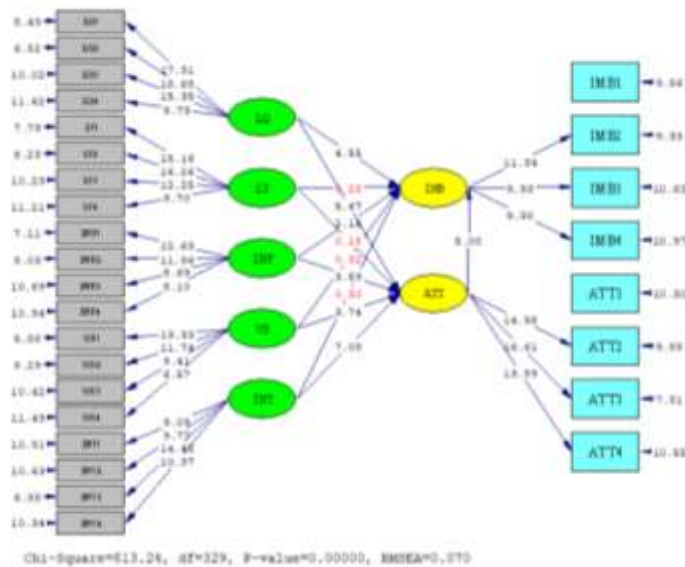


Figure 4.1. Structural Model with t-values (LISREL Output)

Source: Data processed (2026)

Hypothesis Testing

Hypothesis testing was conducted by examining the path coefficients and their corresponding t-values. A hypothesis was supported if the t-value exceeded 1.96 ($\alpha = 0.05$). The results are summarized in Table 4.

Table 4.4. Hypothesis Testing Results

Hypothesis	Path	Coef.	t-value	Decision
H1	Limited Quantity → Attitude	0.34	5.67	Supported
H2	Limited Time → Attitude	0.01	0.18	Not supported
H3	Information → Attitude	0.20	3.59	Supported
H4	Visuality → Attitude	0.20	3.74	Supported
H5	Entertainment → Attitude	0.45	7.08	Supported
H6	Attitude → Impulse Buying	0.52	5.00	Supported
H7	Limited Quantity → Impulse Buying	0.32	4.55	Supported

H8	Limited Time → Impulse Buying	0.01	0.28	Not supported
H9	Information → Impulse Buying	0.13	2.16	Supported
H10	Visuality → Impulse Buying	0.02	0.32	Not supported
H11	Entertainment → Impulse Buying	0.02	0.30	Not supported

Source: Data processed (2026)

Seven of the eleven hypotheses were supported. Limited quantity, information, visuality, and entertainment significantly influenced attitude, while limited time showed no significant effect. Attitude had a strong positive effect on impulse buying. In addition, limited quantity and information exerted significant direct effects on impulse buying. Visuality and entertainment influenced impulse buying only indirectly through attitude, highlighting the central mediating role of attitude in the model. The model explained 64% of the variance in attitude ($R^2 = 0.64$) and 71% of the variance in impulse buying ($R^2 = 0.71$), with a predictive relevance (Q^2) of 0.896, indicating strong predictive power.

The Asymmetric Effects of Scarcity Cues

One of the most notable findings concerns the divergent roles of limited quantity and limited time as scarcity stimuli. Limited quantity was found to exert significant positive effects on both attitude and impulse buying. This result strongly supports scarcity theory, which argues that perceived unavailability enhances the perceived value of an offer and triggers psychological reactance, prompting consumers to act quickly to secure the limited resource (Cialdini & Goldstein, 2004). In the TikTok Shop environment, where stock levels are displayed in real time during live streaming sessions, the visibility of rapidly depleting inventory appears to create a sense of exclusivity and competitive pressure among viewers. This mechanism effectively shapes a more favorable attitude toward the promotion while simultaneously reducing the cognitive deliberation process, thereby increasing the likelihood of spontaneous purchases.

This finding is consistent with previous research in social commerce and live streaming contexts. Akram et al. (2018) and Li et al. (2023) similarly reported that perceived scarcity in the form of limited quantity significantly enhances both consumer evaluation and impulse buying. Lamis et al. (2022) also found that limited quantity in flash sales positively influenced attitude in the Indonesian marketplace setting. The



consistency of these results suggests that limited quantity remains a powerful and reliable promotional tool across different digital commerce platforms, including short-video live commerce.

In contrast, limited time did not significantly influence either attitude or impulse buying. This finding is somewhat surprising given the theoretical expectation from the SOR framework that time pressure should function as a strong situational stimulus capable of accelerating consumer decision-making (Eisenbeiss et al., 2015; M. Zhang et al., 2018). Several contextual explanations may account for this result. First, the sample was predominantly composed of Gen Z consumers (89% aged 17–25), a demographic that has grown up with frequent exposure to time-limited promotions across multiple e-commerce platforms. For this group, countdown timers and short-duration flash sales may have become normalized features rather than novel urgency triggers. As a result, the additional psychological pressure typically associated with limited time may have diminished. Second, in the highly interactive environment of TikTok Shop live streaming, consumers may prioritize other stimuli such as entertainment value, visual presentation, and real-time interaction with the host over temporal pressure alone. This interpretation aligns with Nguyen-Van et al. (2024), who found that not all scarcity dimensions exert equal influence on Gen Z consumers in social commerce contexts.

Platform-Specific Characteristics and Consumer Responses

The three flash sale characteristics information, visuality, and entertainment demonstrated distinct patterns of influence. Entertainment emerged as the strongest predictor of attitude, followed by information and visuality. This result highlights the unique positioning of TikTok Shop as a content-driven rather than purely transactional platform. In live streaming commerce, the combination of dynamic visual content, engaging host communication, and entertaining elements transforms the shopping experience from a functional activity into an enjoyable social interaction. Consequently, consumers develop more positive overall evaluations of the flash sale promotion. This finding extends the work of Li et al. (2024) and X. Gong & Jiang (2023), who emphasized the role of hedonic elements in live commerce, by demonstrating that entertainment can be the dominant attitude-forming stimulus in short-video platforms.

Information also significantly influenced attitude and, importantly, exerted a direct positive effect on impulse buying. High-quality, accurate, and up-to-date product information delivered through live streaming appears to reduce uncertainty and facilitate quicker purchase decisions. This dual effect (on both attitude and direct impulse buying)

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suggests that information serves both cognitive and behavioral functions in the decision-making process. In contrast, while visuality significantly shaped attitude, it did not directly influence impulse buying. This indicates that visual appeal primarily operates by improving consumers' overall assessment of the promotion rather than acting as an immediate behavioral trigger.

Entertainment followed a similar pattern to visuality: it strongly affected attitude but showed no significant direct effect on impulse buying. Although consumers reported high levels of enjoyment and engagement during live streaming flash sales, this positive affective experience did not translate directly into spontaneous purchases. One possible explanation is that entertainment functions primarily as an engagement and retention mechanism rather than a direct purchase driver. Consumers may enjoy the content and develop a favorable attitude toward the promotion, but the actual decision to purchase impulsively appears to depend more heavily on other factors, particularly scarcity cues (limited quantity) and the overall attitude formed. This finding suggests that in highly entertaining live commerce environments, the pathway to impulse buying is more strongly mediated by attitude than by direct affective stimulation.

The Central Role of Attitude as a Mediating Mechanism

Attitude emerged as a strong and significant predictor of impulse buying, consistent with the theoretical positioning of the organism component in the SOR framework (Chan et al., 2017). This result reinforces the view that impulse buying in social commerce is not purely an affective or automatic response but is also shaped by consumers' overall evaluative judgment of the promotional stimulus. The strong path from attitude to impulse buying, combined with the finding that several stimuli (entertainment, visuality, and information) influence impulse buying primarily through attitude, underscores the importance of building positive consumer evaluations rather than relying solely on urgency tactics.

This mediating role of attitude helps explain why some stimuli that strongly affect attitude (such as entertainment) did not show direct effects on impulse buying. It also highlights a potential boundary condition in live commerce: when platforms successfully create enjoyable and engaging experiences, consumers may require a positive overall attitude before translating that experience into actual purchase behavior. This insight contributes to the ongoing discussion in the literature regarding the relative importance of affective versus cognitive pathways in online impulse buying (Chan et al., 2017; Chen et al., 2019; Verhagen & Van Dolen, 2011).



CONCLUSION

This study investigated the influence of flash sale characteristics on consumer attitude and impulse buying behavior on TikTok Shop in Indonesia using the Stimulus–Organism–Response (SOR) framework. Based on data collected from 300 valid respondents, the findings indicate that limited quantity, information, visuality, and entertainment significantly and positively influence consumer attitude, with entertainment emerging as the strongest predictor, while attitude itself significantly promotes impulse buying. Furthermore, limited quantity and information directly affect impulse buying, whereas visuality and entertainment exert indirect effects through attitude, highlighting the central mediating role of consumer attitude in live commerce environments. In contrast, limited time was found to have no significant effect on either attitude or impulse buying, suggesting that time scarcity may no longer be an effective stimulus for digitally native consumers who are frequently exposed to promotional campaigns. The study contributes to the social commerce literature by extending the application of the SOR framework to TikTok Shop, providing a more nuanced understanding of flash sale dimensions and revealing the diminishing effectiveness of temporal scarcity among Gen Z consumers. From a practical perspective, the findings suggest that sellers and platform managers should prioritize limited-quantity promotions, informative content, engaging live-streaming experiences, and visually appealing presentations to enhance consumer attitudes and stimulate impulse purchases. However, the study is limited by its focus on predominantly young consumers from Western Indonesia, its cross-sectional design, and the absence of a formal mediation analysis. Future research is therefore encouraged to employ longitudinal or experimental approaches, examine moderating factors such as impulsivity, live commerce experience, and cultural orientation, conduct cross-platform comparisons, and incorporate additional variables such as perceived enjoyment, trust, and fear of missing out (FOMO) to develop a more comprehensive understanding of impulse buying behavior in live social commerce settings.

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