Research Article

HOW VISUAL AND SOUND AFFECT GEN Z'S TIKTOK ONLINE IMPULSE BUYING THROUGH AROUSAL AND PLEASURE IN HO CHI MINH CITY, VIETNAM

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ABSTRACT

TikTok's live stream shopping has experienced rapid growth in Vietnam, particularly among Generation Z consumers. This study investigates how visual and sound affect Gen Z's TikTok online impulse buying through arousal and pleasure in Ho Chi Minh City, Vietnam, grounded in the Stimulus–Organism–Response (S-O-R) framework. Data were collected through an online survey, yielding 292 valid responses, and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to test the proposed hypotheses. The results reveal that arousal plays a significant mediating role in the effects of both visual and sound on online impulse buying, whereas pleasure does not exert a mediating effect. These findings underscore the critical role of arousal in shaping unplanned purchasing behavior within TikTok's on live stream shopping, offering theoretical insights into the application of the S-O-R framework in social e-commerce and practical implications for marketers aiming to engage Gen Z consumers more effectively.

Keywords: online impulse buying; visual stimuli; sound stimuli; arousal; pleasure; Generation Z; TikTok.

INTRODUCTION

The rapid growth of e-commerce in Vietnam has transformed consumer shopping behavior in recent years. The total revenue of the industry is projected to reach $35 billion by 2025 (Nguyen Hanh, 2025). In 2024 alone, sales from the four dominant platforms such as Shopee, Lazada, TikTok Shop, and Tiki, rose by 40% to $13.8 billion, setting a record for the sector (Thong, 2025). While Shopee and Lazada maintain strongholds in traditional e-commerce through search-driven and static product listings, TikTok Live Shopping has disrupted the market by merging entertainment, interactivity, and real-time purchasing. Despite Shopee capturing 67.9% of gross merchandise value (GMV) in 2024, TikTok Shop rapidly secured a substantial market share, reflecting its growing influence in Vietnam's digital retail ecosystem (Nguyen Hanh, 2024). This rise illustrates the increasing adoption of livestreaming e-commerce as a dynamic form of interactive commerce.

Livestreaming e-commerce is characterized by real-time engagement and rich visual-verbal cues, allowing consumers to observe product demonstrations while simultaneously fostering psychological interaction with the products (Zhang, Jiang, Turner, & Pahlevan-Sharif, 2022; Wang, Luo, Luo, & Xu, 2024). As such, visual and sound stimuli emerge as crucial factors shaping consumer experiences in livestreaming e-commerce. Unlike conventional e-commerce, which is largely planned and search-driven, TikTok's livestreaming model encourages emotional resonance, spontaneous decision-making, and impulse purchases (Wang *et al.,* 2024).

Existing research indicates that impulse buying in digital commerce is influenced by a combination of psychological drivers (e.g., arousal and pleasure) and technological affordances (e.g., ease of use and interactivity) (Zhang *et al.,* 2022). Especially, Ngo *et al.,* (2024)

examine the comprehensive model about how external factors (i.e., time pressure, quantity pressure, economic benefits, social influence, visual, and sound) affect online impulse buying by mediating emotions of arousal and pleasure among Gen Z on Shopee video platform. Among the most active participants is Generation Z who are deeply engaged with technology and display a strong preference for online over offline shopping (Wood, 2022; Ngo *et al.,* 2024). However, Gen Z is particularly susceptible to persuasive triggers, as factors such as scarcity and social proof heighten FOMO (Fear of Missing Out), thereby accelerating unplanned purchases (Zhang *et al.,* 2022). As mentioned above, although visual and sound are important factors in TikTok's livestreaming e-commerce, limited research has examined how visual and sound influence consumers' online impulse buying through their pleasure and arousal. The Stimulus-Organism-Response (S-O-R) model provides a useful theoretical lens for understanding this relationship. Thus, this study investigates how visual and sound in TikTok's live streaming e-commerce influence impulse buying behavior through pleasure and arousal among Generation Z.

LITERATURE REVIEW

The Stimulus–Organism–Response (S-O-R) model (Mehrabian & Russell, 1974) provides the theoretical foundation for examining impulse buying in TikTok's live stream shopping environment. The model explains how environmental stimuli (S) influence consumers' internal cognitive and emotional states (O), which in turn lead to behavioral outcomes (R). In the context of social commerce, external stimuli include platform content and interactive features that trigger consumers' psychological and affective responses (Wang, 2019).

A growing body of research has applied the S-O-R framework to study impulse buying across various digital retail settings. For instance, Wu and Li (2018) demonstrated how website aesthetics and interactivity stimulate emotional responses that enhance purchase likelihood, while Kamboj, Sarmah, Gupta, and Dwivedi (2018) found that branding and social engagement within online communities foster

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consumer involvement and unplanned purchases. Similarly, Chan, Cheung, and Lee (2017) highlighted the explanatory power of the model in understanding online impulse buying through the interaction of environmental cues, consumer emotions, and behavioral outcomes. Recent studies have applied the S-O-R model to examine impulse buying in e- commerce settings. For example, Zhang et al. (2022) focused on mobile impulse purchase intentions during the COVID-19 pandemic. Xiang, Zheng, Lee, and Zhao (2016) examined the role of parasocial interaction in social commerce through the S-O-R lens, and Handayani, Purwandari, Solichah, and Prima (2018) studied the effect of Instagram's call-to-action buttons on impulse buying behavior. These applications demonstrate the model's adaptability and explanatory power across diverse digital retail environments. Given the relevance of this model in explaining the psychological mechanisms driving unplanned purchases, it is appropriate for this study, which investigates how external stimuli (e.g., visual and sound) in TikTok's live stream shopping environment influence consumer emotions (e.g., pleasure and arousal) and drive impulse buying decisions. The stimulus refers to external triggers that activate consumer responses, which may include marketing stimuli or situational stimuli (Chan *et al.,* 2017; Kamboj *et al.,* 2018). The organism represents the internal emotional and cognitive state of an individual and serves as an intermediary mechanism between the stimulus and the response (Basha *et al.,* 2022; Zheng, Yao, Zhang, & Wang, 2019). The response refers to the behavioral outcome, which, in this study, is impulse buying (Kamboj *et al.,* 2018).

Applying the S-O-R model, our study considers stimuli (S) as external factors such as visual and sound that evoke consumer reactions. The organism (O) represents consumers' internal states, including emotions like pleasure and arousal. The response (R) refers to the resulting consumer behavior, namely online impulse buying.

Hypothesis development

Product presentation in live stream shopping environments leverage visual elements to significantly influence impulse buying behavior, particularly among Generation Z consumers (Wang *et al.,* 2024). Effective visual merchandising, including elements like themes, color schemes, lighting effects, and dynamic product displays, plays a crucial role in enhancing emotional engagement (Aires, Dias, & Pereira, 2024). Meanwhile, arousal refers to an individual's state of alertness, stimulation, excitement, and activity, which varies depending on the context (Mehrabian & Russell, 1974). Moreover, pleasure is defined as a sense of contentment, happiness, or satisfaction (Mehrabian & Russell, 1974). Therefore, product presentation can enhance feelings of pleasure and arousal during the shopping experience, highlighting the importance of visual design in the platform's marketing efforts (Dong, Huang, Hu, Zhang, & Wang, 2023). Ngo *et al.,* (2024) found that visual have positive effects on both arousal and pleasure. Thus, we propose that the effects still present in TikTok live stream.

H1. Visual has a positive effect on arousal.

H2. Visual has a positive effect on pleasure.

Sound also affects pleasure and arousal (Carraturo, Kliuchko, & Brattico, 2024; Yin, Shao, Hao, & Lu, 2024). The strategic use of sound elements in TikTok livestream shopping plays a crucial role in shaping consumer emotions and influencing impulse buying behavior, particularly among Generation Z consumers. Research suggests that background music, host voice tone, sound effects, and audience interactions create an immersive audio-visual experience that enhances emotional engagement \ (Liang & Yu, 2024). By integrating background music, rhythmic pacing, and interactive real-time audio

cues, TikTok live stream shopping can create an engaging and immersive atmosphere. (Chen, Ha, & Vu, 2023). Therefore, we propose that:

H3. Sound has a positive effect on arousal.

H4. Sound has a positive effect on pleasure.

In online shopping environments, consumers 'arousal plays a key role in enhancing pleasure, as heightened arousal has been shown to positively influence pleasure across various consumer experiences (Hsieh, Hsieh, Chiu, & Yang, 2014; Ngo *et al.,* 2024). The influence of internal emotions, particularly arousal and pleasure, plays a critical role in impulsive buying behaviors in online shopping(Xu, Dzever, & Zhao, 2023). Research suggests that online impulse purchases are often triggered by emotional responses, which result from the interaction between cognitive states, affective experiences, and external stimuli. Consumers who experience high levels of arousal and pleasure are significantly more likely to engage in online impulse buying. Therefore, it is proposed that:

H5. Arousal has a positive effect on pleasure.

H6. Arousal has a positive effect on online impulse buying.

H7. Pleasure has a positive effect on online impulse buying.

Moreover, grounded in the Stimulus–Organism–Response (S-O-R) theory, we propose that when consumers are exposed to external stimuli such as visual and auditory cues, they experience internal emotional states—specifically pleasure and arousal—which subsequently shape their impulse buying behavior. Based on this framework, the following hypotheses are proposed:

H8a: Arousal positively mediates the effect of visual and online impulse buying.

H8b: Arousal positively mediates the effect of sound and online impulse buying.

H9a: Pleasure positively mediates the effect of visual and online impulse buying.

H9b: Pleasure positively mediates the effect of sound and online impulse buying.
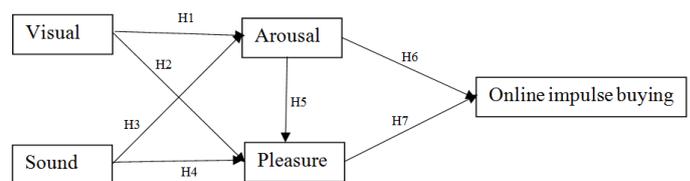

Figure 1. Proposed model

RESEARCH METHOD

Variable measurement

Table 1: Measurement Items

Constructs	Items	Observed Variables	Sources
Visual	VS	The content shown on TikTok Live is aesthetic, attractive, visually appealing, and a visual treat.	Adapted from Hsieh et al. (2014), Chang, Chih, Liou, and Hwang (2014), and Ngo et al. (2024)
	VS	I find the way TikTok Live displays the product information is attractive.	

	VS	I find the overall look and feel of TikTok Live is visually appealing.	
	VS	I like the visual appearances of TikTok Live	
Sound	SO	The background sound used on TikTok Live is euphonic.	Adapted from Hsieh et al. (2014), Huang, Ali, and Liao (2017), and Ngo et al. (2024)
	SO	The background sound used on TikTok Live is good.	
	SO	The background sound used on TikTok Live is melodic.	
	SO	The background sound used on TikTok Live is pleasant.	
Arousal	AR	When I was shopping on TikTok Live, I felt excited.	Adapted from Huang et al. (2017), Chang et al. (2014), and Ngo et al. (2024)
	AR	When I was shopping on TikTok Live, I felt active.	
	AR	When I was shopping on TikTok Live, I felt aroused.	
	AR	When I was shopping on TikTok Live, I felt stimulated.	
Pleasure	PL	When I was shopping onTikTok Live, I felt happy.	Adapted from Huang et al. (2017), Chang et al. (2014) and Ngo et al. (2024)
	PL	When I was shopping on TikTok Live, I felt pleased.	
	PL	When I was shopping on TikTok Live, I felt satisfied.	
	PL	When I was shopping on TikTok Live, I felt fulfilled.	
Online Impulse Buying	OIB	I usually buy products on TikTok Live spontaneously.	Adapted from Rook & Fisher (1995), Zheng et al. (2019) and Ngo et al. (2024)
	OIB	The products I bought on TikTok Live are mostly unplanned.	
	OIB	I bought a product on TikTok Live that I did not initially want to buy.	
	OIB	I sometimes cannot suppress the feeling of wanting to buy something online.	

Data collection

The target respondents for this study are individuals aged 18 to 27, primarily belonging to Generation Z (Gen Z). This generation, typically defined as those born between 1997 and 2012, is characterized by their deep integration with digital technology, social media, and e-commerce platforms. Gen Z consumers are known for their high engagement with online content, preference for interactive shopping experiences, and susceptibility to digital marketing strategies, making them a key demographic for studying online impulse buying behaviors, particularly in the context of TikTok Live shopping.

Before collecting data, a pilot test was conducted to identify and address weaknesses in the questionnaire, such as issues related to timing, accuracy, clarity, and readability. The data collection process was carried out systematically over a three-month period, from March to May 2025, to enhance the reliability and validity of the study. The survey was designed using Google Forms and distributed online through various channels, including social media platforms (e.g., Facebook) and email. This approach facilitated the collection of a sufficient and diverse sample for analysis.

A non-probability convenience sampling method was employed, resulting in 292 valid responses from Vietnamese Gen Z consumers who had previously watched at least one TikTok Live shopping stream. While convenience sampling allows efficient access to participants, it has inherent limitations, as selection is based on accessibility rather than randomization, potentially reducing sample representativeness and limiting generalizability. To mitigate these concerns, the survey was shared across multiple platforms to broaden reach, and demographic data were monitored to identify underrepresented groups, with targeted efforts made to encourage their participation. Nevertheless, the limitations of convenience sampling should be acknowledged when interpreting the study's findings.

RESULTS

Descriptive statistics

Of the 295 valid observations, women account for 67.5% and men for 31.5%. The distribution shows that the sample's gender representation leans towards female respondents. In terms of age distribution, the predominant group consists of 99% of respondents aged between 18 and 27 years (Gen Z), indicating a young demographic dominance in the sample. Most respondents are aged 20 to 22, with 22 years old being the largest group (29.1%). Regarding education level, the majority of respondents (75.9%) hold a bachelor's degree, suggesting a relatively high educational background among participants. The job status distribution shows that 86.1% are students, 8.1% are currently employed, and the remaining respondents fall into other categories, reflecting a varied occupational profile. Geographically, the majority of respondents reside in Ho Chi Minh City (74.6%), followed by Hanoi (19.3%). Smaller proportions live in Da Nang (4.1%), Tay Ninh (0.3%), Hue (0.3%), and Vinh Phuc (0.3%).Regarding purchase frequency within one month, nearly half of the respondents (49.5%) make purchases 3 to 5 times. Meanwhile, 33.6% shop less than twice a month, and 15.9% purchase more than five times. A small portion (1.0%) reported other frequencies, reflecting varied shopping habits.

Model testing

Measurement model testing

PLS-SEM was applied to assess the reliability and validity of the measurement model. At first, indicator reliability was examined by observing the outer loadings of each item. After that, the structural model (inner model) was analyzed to test the proposed hypotheses and assess the relationships between constructions (Caldeira & Kastenholz, 2018).

To ensure the reliability of indicators in the initial step, it is crucial that the variables achieve a Cronbach's alpha of at least 0.7 to confirm their reliability. Furthermore, any indicators with outer loadings below the cutoff value of 0.7 should be removed from the model (Henseler, Ringle, & Sarstedt, 2012). In the first run, we see that VS1 does not meet the requirement of 0.7. So VS1 was eliminated. Then, we run the second time, indicator reliability is confirmed when outer loadings exceed 0.7. Additionally, Cronbach's alpha, composite reliability (rho_A), and Dillon-Goldstein's rho (rho_c) all exceed 0.7, showing good internal consistency in the measurement model and indicating a

positive outcome. Table 4 shows that AVE values higher than the usual cutoff of 0.5, which means that the constructions are valid.

Table 2: Summary of key indicators

Latent variables	Items	Mean	SD	Cronbach's α	Rho_A	CR	AVE
	Threshold			≥ 0.7	≥ 0.7	≥ 0.7	≥ 0.5
Sound (SO)	SO1	3.705	0.952	0.838	0.842	0.892	0.673
	SO2	3.695	0.891				
	SO3	3.531	0.949				
	SO4	3.654	0.955				
Visual (VS)	VS2	4.021	0.78	0.724	0.755	0.842	0.641
	VS3	4.103	0.778				
	VS4	4.003	0.889				
Pleasure (PL)	PL1	4	0.836	0.714	0.715	0.824	0.539
	PL2	4.01	0.8				
	PL3	4.089	0.784				
	PL4	3.997	0.83				
Arousal (AR)	AR1	4.099	0.803	0.827	0.83	0.885	0.659
	AR2	3.99	0.927				
	AR3	3.901	0.903				
	AR4	3.928	0.971				
Online Impulse Buying (OIB)	OIB1	3.685	1.042	0.768	0.77	0.851	0.589
	OIB2	3.62	1.045				
	OIB3	3.849	1.029				
	OIB4	3.86	0.995				

Table 3: Outer Loading Values

	Arousal	Online Impulse Buying	Pleasure	Sound	Visual
AR1	0.771				
AR2	0.822				
AR3	0.813				
AR4	0.839				
OIB1		0.785			
OIB2		0.756			
OIB3		0.779			
OIB4		0.749			
PL1			0.708		
PL2			0.752		
PL3			0.759		
PL4			0.717		
SO1				0.784	
SO2				0.845	
SO3				0.836	
SO4				0.816	
VS2					0.800
VS3					0.739
VS4					0.858

Notes: *VS1 are eliminated from the table because their outer loading values are less than 0.7.*

Regarding discriminant validity, this study applied the Fornell & Larcker criterion (1981) and the Heterotrait-Monotrait Ratio (HTMT) criterion (Henseler, Ringle, & Sarstedt, 2015). As shown in Table 2, the square roots of the AVE values, shown on the diagonal for each construct, exceed the correlation coefficient of that construct with other factors, satisfying the Fornell & Larcker criterion. In addition, the HTMT values in Table 5 are all below the threshold of 0.85, with the highest value being 0.795, which further confirms adequate discriminant validity among the constructs.

Table 4. Fornell & Lacker criterion

	Arousal	Online Impulse Buying	Pleasure	Sound	Visual
AR	0.812				
OIB	0.456	0.767			
PL	0.614	0.396	0.734		
SO	0.466	0.390	0.476	0.821	
VS	0.518	0.371	0.503	0.487	0.801

Note: The square roots of AVEs are in bold on diagonal

Table 5. Heterotrait-Monotrait Ratio (HTMT) criterion

	AR	OIB	PL	SO	VS
AR					
OIB	0.566				
PL	0.795	0.533			
SO	0.560	0.486	0.611		
VS	0.651	0.482	0.682	0.628	

To assess the model's explanatory power, R-squared values were calculated. R^2 reflects the proportion of variance in the dependent constructs explained by the independent variables (Hair, Hult, Ringle, & Sarstedt, 2017). According to Cohen *et al.,* (2013), R^2 values of 0.26, 0.13, and 0.02 are considered high, medium, and low, respectively. Pleasure (R^2 = 0.447) and Arousal (R^2 = 0.328) are classified as high, while Online Impulse Buying (R^2 = 0.230) falls into the medium category. These results suggest the model has strong explanatory power, particularly for emotional responses.

To evaluate the model's predictive relevance, the Q^2 statistic was examined. As shown in Table 11, all constructs (AR = 0.310, PL = 0.306, OIB = 0.167) yield positive Q^2 values, indicating that the model has good predictive accuracy and relevance. Additionally, model fit was assessed using the Standardized Root Mean Square Residual (SRMR). According to Henseler *et al.,* (2015), an SRMR value below 0.08 suggests a good model fit. In this study, the SRMR values for both the saturated model (0.066) and estimated model (0.072) fall below this threshold, further confirming the model's adequacy. Together, these results demonstrate that the model is both predictive and well-fitting.

Structural model testing

Subsequent to the analysis of the measurement model, the inner model was examined and the proposed hypotheses were tested using bootstrapping with 5,000 subsamples to calculate significance values through two-tailed t-tests (Caldeira & Kastenholz, 2018). The findings show that for the direct effects, all hypotheses (H1, H2, H3, H4, H5, H6, and H7) were accepted. Specifically, visual has a positive effect on arousal (H1: β= 0.382, p = 0.000), visual has a positive effect on pleasure (H2: β= 0.192, p = 0.001), sound has a positive effect on arousal (H3: β= 0.28, p = 0.000), sound has a positive effect on pleasure (H4: β= 0.182, p = 0.002), arousal has a positive effect on pleasure (H5: β= 0.43, p = 0.000), arousal has a positive effect on online impulse buying(H6: β= 0.342, p = 0.000), pleasure has a positive effect on online impulse buying (H7: β= 0.186, p = 0.007). Moreover, for indirect effects, H8a and H8b were supported. Specifically, arousal significantly mediates the effect of visual and online impulse buying (H8a: β= 0.131, p = 0.000) and arousal significantly mediates the effect of sound and online impulse buying (H8b: β= 0.096, p = 0.002).Fortunately, H9a and H9b were not supported. Specifically, pleasure insignificantly mediates the effect of visual and online impulse buying (H9a: β= 0.036, p = 0.056) and pleasure insignificantly mediates the effect of sound and online impulse buying (H9b: β= 0.034, p = 0.062).

DISCUSSIONS

The findings of this study provide significant insights into the psychological mechanisms underlying online impulse buying in the context of TikTok's live stream shopping environment. The results demonstrate that both visual and sound stimuli play crucial roles in influencing consumer emotions, specifically arousal and pleasure, which in turn drive impulse buying behavior.

The analysis reveals that visual stimuli exert a strong positive effect on arousal and a moderate positive effect on pleasure, supporting prior literature that emphasizes the importance of visual cues in digital commerce environments (Wu & Li, 2018). Similarly, sound stimuli significantly enhance both arousal and pleasure, corroborating findings from sounds cape research that auditory experiences strongly shape emotional responses (Yin *et al.,* 2024). These results suggest that in TikTok's livestreaming e-commerce, where multisensory engagement is prominent, both visuals and sounds serve as powerful external triggers for consumer emotions.

Among emotional responses, arousal emerges as a stronger determinant compared to pleasure. Arousal not only positively influences pleasure but also exerts a more substantial direct effect on impulse buying, confirming the S-O-R model's assertion that heightened emotional activation stimulates behavioral responses (Mehrabian & Russell, 1974). Pleasure, although significant, demonstrates a weaker influence on impulse buying. This suggests that while enjoyment enhances purchase intentions, it is the heightened sense of excitement and urgency that primarily drives unplanned purchasing behavior in TikTok's live streaming e-commerce.

However, for indirect effects, contrary to expectations, pleasure does not significantly mediate the relationship between visual/sound stimuli and impulse buying. This implies that while pleasure is a positive emotional outcome of sensory stimuli, it does not serve as a strong intermediary in driving unplanned purchases. Instead, arousal fully mediates the effects of both visual and sound stimuli on impulse buying. This finding highlights arousal as a critical emotional pathway in TikTok's livestreaming e-commerce.

Theoretical and practical implications

Theoretically, this study strengthens the explanatory power of the S-O-R framework in TikTok's live streaming e-commerce by identifying arousal as the dominant emotional driver of impulse buying. It extends prior research (e.g., Xiang *et al.,* 2016; Zhang *et al.,* 2022) by showing that only arousal mediate the effects of visual and sound on online impulse buying.

Practically, the findings suggest that TikTok's e-commerce platform and marketers should prioritize strategies that heighten consumer arousal through dynamic product presentations, interactive sound effects, and engaging visual displays. While fostering pleasure remains relevant for creating a positive shopping experience, enhancing arousal appears more effective in stimulating impulse buying behavior.

LIMITATIONS AND FUTURE RESEARCH

This study has several limitations that should be considered in future research. First, the reliance on self-reported survey data may introduce bias. Future studies should incorporate more objective methods, such as third-party evaluations, website metrics (e.g., live stream viewing duration), or direct observation. Second, this study employed convenience sampling, with most participants drawn from the researcher's network, which limits the generalizability of the findings. To address this, future research should use broader sampling methods, such as MTurk or other survey platforms, to reach more diverse populations. Lastly, most respondents were students in Ho Chi Minh City, which may not represent individuals from other regions or those with stable employment and income. Future studies should include participants from different cities or provinces and apply stratified sampling to ensure greater diversity and representativeness.

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