

Impulse Buying in Live Streaming Commerce: Unveiling Influential Factors through the Stimulus- Organism-Response Model and Self-Control

Jia Jia Sim (Corresponding author)
Universiti Tunku Abdul Rahman
simjj@utar.edu.my

Siu Hong Loh
Universiti Tunku Abdul Rahman
lohsh@utar.edu.my

Chee Choon Liew
Universiti Tunku Abdul Rahman
cheechoon0012@1utar.my

Cheng Hong Yeoh
Universiti Tunku Abdul Rahman
chenghong@1utar.my

ABSTRACT

This study investigates the factors influencing impulse buying in live streaming commerce using the Stimulus-Organism-Response (S-O-R) model. As a rapidly growing e-commerce trend, live streaming commerce offers unique opportunities and challenges for both marketers and consumers. This study hypothesized that attractiveness, social presence, and promotional incentive (stimuli) enhance perceived enjoyment (organism), which in turn drives impulse buying (response). Self-control was examined both as a direct predictor of impulse buying and as a moderator between perceived enjoyment and impulse buying. Data collected from respondents were evaluated using PLS-SEM. It is observed that all three stimuli positively impact perceived enjoyment, which significantly influences impulse buying. Self-control has a negative effect on impulse buying but does not moderate the relationship between perceived enjoyment and impulse buying. These results offer actionable insights for marketers in the context of live streaming commerce. It is important to balance promotional strategies with consumer awareness to promote rational purchasing decisions.

Keywords: Live Streaming Commerce, E-commerce, Stimulus-Organism-Response Model, Self-Control, Impulse Buying

1. INTRODUCTION

Live streaming commerce is quickly reshaping the online shopping landscape, offering companies new ways to connect with their customers. As interest in the live streaming commerce market grows, so does the body of research exploring live streaming and its link to impulse buying. Live streaming adds a stronger sense of authenticity and immediate interaction between buyers and sellers, creating emotional connections that often lead to impulse purchases [1], [2], [3], [4], [5]. While this approach has shown clear benefits, it also raises concerns. Impulse buying can lead to overspending, promote unnecessary consumption, and pose challenges to sustainable consumer habits [6], [7].

Recent data shows that consumers in Asia (30%) are more likely to shop directly through live streams compared to the global average (16%) [8]. In Malaysia, this trend is even more pronounced: 31% of consumers report making purchases through live streams, surpassing China's 27% [8]. Young consumers are a major driving force behind this trend, with their buying habits contribute to the rise of live streaming commerce in the country [9]. Studies further indicate that young Malaysians are particularly susceptible to spontaneous and emotionally driven purchasing decisions, which may increase their tendency toward impulse buying in live streaming environments [9]. These tendencies highlight the importance of examining the underlying psychological processes that shape impulsive buying behavior within the context of live streaming commerce.

Although the live streaming commerce scene is maturing, there's still limited research explaining why it tends to spark more impulse purchases, especially among Malaysian consumers. While past studies have identified factors like physical appeal, social presence, and promotional tactics as strong drivers of perceived enjoyment and, in turn, impulsive buying, most of this work has focused on the Chinese market [2], [10], [11]. As Liu et al. (2022) pointed out, cultural differences and the level of digital development in each country can shape consumer behavior in different ways [12]. That's why Malaysia's distinct cultural setting and evolving e-commerce environment deserve closer attention. This study seeks to fill that gap by studying what influences impulse buying in Malaysia's live streaming commerce space.

One key factor in impulsive buying is low self-control [13], [14]. People with higher self-control tend to make more deliberate decisions, often resisting the urge to buy on impulse. Yet, most studies in this area look at external influences, like product features or social cues, and rarely consider how individual traits like self-control might shape buying behavior. To better understand this, the current study examines self-control as a moderating factor in the link between perceived enjoyment and impulse buying.

Earlier research has shown that self-control can weaken the connection between emotional triggers and impulsive shopping. For example, Gulfranz et al. (2022) found that self-control decreased the influence of attitudinal loyalty on impulse buying [15],

and Sun et al. (2023) reported a similar finding for positive emotions [1]. However, these studies were conducted in traditional e-commerce or group-buying contexts, which lack the real-time interaction, social presence, and time-limited promotional cues that characterize live streaming commerce. The highly immersive and fast-paced nature of live streaming may intensify emotional arousal and reduce deliberative processing, potentially altering the way self-control operates in this environment. Although impulse buying has been examined in live streaming settings [16], [17], limited research has investigated whether individual traits such as self-control moderate consumers' responses in this unique context. Addressing this gap, the present study examines how self-control shapes the relationship between perceived enjoyment and impulse buying during live streaming commerce.

2. LITERATURE REVIEW

2.1 Stimulus-Organism-Response (S-O-R) Model

The Stimulus-Organism-Response (S-O-R) model consists of three main components: Stimulus (S), Organism (O), and Response (R). Stimuli refer to external factors that affect an individual's emotions and thought processes [18]. Organism describes the internal mechanisms (both cognitive and emotional) that are triggered by these external stimuli. Cognitive processes involve the ways individuals interpret and form attitudes based on incoming information, while emotional processes relate to the feelings evoked during these interactions [19]. Finally, Response reflects the resulting decisions or behaviors, such as approaching or avoiding, that individuals exhibit when influenced by these internal processes [18].

Donovan and Rossiter (1982) were among the first to apply the S-O-R framework, examining how elements of the retail environment shape customers' emotional and cognitive reactions, ultimately influencing their purchasing choices [18]. Their pioneering work set the stage for deeper investigations into the complexities of consumer behavior. In essence, the S-O-R model describes how external stimuli interact with internal states to shape human responses.

More recently, researchers have applied the S-O-R framework to understand impulsive buying in live streaming commerce. Studies by Zheng et al. (2023), Lee and Chen (2021), and Huo et al. (2023) demonstrate the model's effectiveness in capturing the dynamics of this fast-evolving form of shopping [11], [17], [20]. As live streaming platforms continue to grow, the S-O-R framework provides valuable insights into how platform features shape consumer responses. In this study, the S-O-R model is adopted to assess the factors that influence impulse buying behavior among Malaysian consumers during live streams. Drawing on prior work by Lee and Chen (2021), Huo et al. (2023), Wu et al. (2021), and Zhu et al. (2022), this research focuses on specific stimuli (streamer attractiveness, social presence, and promotional incentives) and their effects on perceived enjoyment (organism), which then drive impulse buying (response) [11], [17], [21], [22].

Impulse buying is often conceptualized as a conflict between immediate emotional gratification and long-term self-regulation [23]. Self-control refers to an individual's capacity to regulate thoughts, emotions, and behaviors in order to resist short-term temptations and align actions with long-term goals [24], [25]. The relevance of self-control becomes particularly significant in live streaming commerce. Unlike traditional online shopping environments, live streaming platforms are characterized by real-time interaction, social presence, entertainment-driven content, and time-limited promotional cues [2], [3]. These features may heighten emotional arousal and reduce opportunities for reflective processing, thereby increasing susceptibility to impulse buying [2], [3]. In such fast-paced and immersive settings, individual differences in self-control may play a critical role in determining whether perceived enjoyment translates into actual impulsive purchasing behavior.

Within the S-O-R framework adopted in this study, self-control is conceptualized as both a direct predictor of impulse buying and a moderating variable that influences the relationship between perceived enjoyment (organism) and impulse buying (response). By incorporating self-control into the model, this study extends prior S-O-R applications by introducing an individual-level regulatory mechanism that shapes consumer responses in live streaming commerce.

2.2 Perceived Enjoyment

Perceived Enjoyment (PE) refers to an individual's intrinsic appreciation of the pleasure experienced when interacting with technology, independent of any anticipated outcomes or consequences [26], [27]. Dwitya and Hartono (2023) further highlight that the generation of pleasure and enjoyment plays an important role in influencing users' intentions to engage with social networks, positioning enjoyment as a crucial driver of user participation [28]. As such, PE serves as a key determinant of consumer attitudes and behavioral intentions [26], [28], [29].

As a fundamental element of the flow experience, PE captures the intrinsic satisfaction and pleasure individuals derive from deep concentration and immersion in an activity [20]. In live streaming commerce, PE refers to consumers' internal emotional responses during their engagement with live streams, particularly feelings of excitement, joy, and happiness [16].

2.3 Attractiveness

Attractiveness (ATT) refers to audiences' perceptions of a streamer's personality, appearance, and talents as exhibited during live streaming sessions [17]. Viewers are often drawn to streamers who are either visually appealing or demonstrate professional competence. Streamers with desirable traits, such as sociability and intelligence, are generally preferred [20]. Furthermore, Guo et al. (2022) identified ATT as closely linked to attributes such as warmth and physical beauty [30], while Peng et al. (2020) confirmed that physically attractive salespeople tend to be more popular and achieve higher sales [31].

During live streaming activities, attractive streamers play a crucial role in drawing viewers, enhancing favorability toward the information source (such as endorsed products). This makes it easier to persuade viewers to make purchases [20], [30], [32]. Such streamers not only attract larger audiences but also stimulate viewers' enjoyment and strengthen their purchase intentions. Additionally, Li et al. (2024) demonstrated that ATT positively influences emotional pleasure, ultimately driving impulse purchases [33]. Streamers with high levels of ATT often facilitate positive social interactions, fostering an enjoyable flow experience [10].

ATT has been shown to positively influence PE. Studies by Tang et al. (2022) and Lee and Chen (2021) confirmed that streamer attractiveness enhances viewers' enjoyment [16], [17]. However, Zheng et al. (2023) presented a contrasting finding, suggesting no significant relationship between ATT and flow experience, indicating that an attractive streamer may not always contribute to PE [20]. Thus, this study proposes the following hypothesis:

H1: Attractiveness positively affects perceived enjoyment.

2.4 Social Presence

Social Presence (SP) refers to the degree to which viewers feel connected to and interact with others as independent and authentic individuals while engaging with media products [34]. In virtual contexts, SP suggests that online human interactions can be as genuine and meaningful as face-to-face communication [21], [35]. Live streaming strengthens SP through features such as personalized attention and real-time interaction, enhancing the sense of connection between viewers and streamers [21].

Within the live streaming environment, SP is characterized by emotional support, real-time interactivity, and a sense of community [35], [36]. Emotional support refers to the feeling of being cared for and understood by others, while interactivity emphasizes the ability to engage in immediate conversations and exchanges [36]. A sense of community reflects the perception of belonging to a group with shared interests [36]. A strong SP significantly enriches user experiences in live streaming, leading to increased enjoyment and a greater sense of belonging [21], [37], [38].

In online shopping contexts, SP positively influences consumers' purchase intentions and behaviors [2], [20]. Live streaming commerce replicates aspects of face-to-face communication by enabling actual interaction between consumers and streamers, thereby enhancing the overall shopping experience [37]. Zhu et al. (2022) found that individuals with a strong sense of belonging experience greater enjoyment [21]. Moreover, Ming et al. (2021) identified four types of SP (platform, viewer, streamer, and telepresence), each contributing positively to flow states and trust, ultimately driving impulse purchases [2].

Research consistently highlights that a robust SP enhances user enjoyment in live streaming commerce and fosters positive behavioral responses [11], [38]. Based on this, the following hypothesis is proposed:

H2: Social presence positively affects perceived enjoyment.

2.5 Promotion Incentive

Promotion Incentive (PI) refers to immediate marketing offers provided by e-commerce merchants, including limited-time discounts, price reductions, and bonus activities [39]. These incentives serve as persuasive tools to boost product purchases by increasing the reach and frequency of advertising [40]. Promotional strategies often rely on principles of scarcity (such as limited availability or time constraints) to encourage impulse buying. Common tactics include price markdowns, bonus packs, and discount coupons [22]. Besides, such promotions are also used to heighten customer engagement and facilitate information sharing, thereby generating hedonic value [41]. According to Akram et al. (2018), PI fulfills both utilitarian and hedonic consumer needs, while also functioning as an effective short-term sales strategy for sellers [42].

Promotional offers within live streaming commerce environments stimulate positive emotions and drive purchasing behavior. Elements such as discounts, free gifts, and exclusive deals evoke feelings of excitement and satisfaction, while limited-time offers and surprise promotions foster a sense of urgency and anticipation. These mechanisms appeal to consumers' desire for hedonic rewards, as noted by Chandon et al. (2000) and reinforced by Sinha and Verma (2020) [43], [44]. Consumers actively engaged in live streams are especially responsive to such promotional tactics, often leading to impulse buying behavior. Sinha and Verma (2020) further noted that attractive promotions enhance hedonic benefits and elevate perceived consumer value [44]. Similarly, Muhammad et al. (2024) found that promotional features (such as price discounts and scarcity) positively influence consumers' emotional responses and contribute to impulsive purchases [45]. Huo et al. (2023) also confirmed that sales promotions in live streaming settings significantly enhance the flow experience, which in turn increases impulse buying behavior [11]. Based on this evidence, the following hypothesis is proposed:

H3: Promotion incentive positively affects perceived enjoyment.

2.6 Impulse Buying

Impulsiveness reflects an individual's tendency to make spontaneous decisions or actions without thoroughly considering potential negative outcomes [46]. In consumer contexts, impulse buying (IB) is illustrated by unplanned and instinctive purchasing behavior driven primarily by strong emotional impulses, often lacking cognitive deliberation [22], [47]. These behaviors are frequently triggered by external factors such as social cues or marketing stimuli [1]. IB typically arises when consumers make immediate purchase decisions based on desirability, rather than thoughtful evaluation [23], [48]. The conflict between the short-term pleasure gained from impulsive purchases and their long-term financial consequences may, over time, lead to chronic or problematic purchasing patterns [23]. However, individuals differ in their

susceptibility to impulsive urges depending on the nature and intensity of the temptation [49].

Within the domain of live streaming commerce, IB can be viewed as a consequence of a person's loss of self-control [11], [50]. Features such as real-time interaction, time-sensitive offers, and seamless purchasing processes enhance the risk of impulsive decisions [33]. While live streaming commerce enhances consumer convenience, it may also contribute to adverse effects like overspending and debt accumulation [51]. As a result, IB is frequently labeled as an irrational and emotionally driven behavior with potentially unhealthy consequences [52]. Within the S-O-R model, IB is theorized as a key behavioral outcome or response to emotional and cognitive stimuli [11], [48], [53].

Within this framework, PE assumes particular theoretical importance because it represents a core affective state that bridges environmental stimuli and behavioral responses [26], [27]. In live streaming commerce, enjoyment is not merely a byproduct of the shopping experience but a central feature of the platform's design, as entertainment, real-time interaction, and social engagement are deliberately embedded into the purchasing process. These characteristics may intensify positive emotional arousal and shift consumers' focus from utilitarian evaluation to hedonic gratification [20].

From a theoretical perspective, PE has been shown to enhance approach-oriented tendencies and reduce cognitive restraint, thereby increasing susceptibility to spontaneous purchasing behavior [20]. When consumers experience heightened enjoyment, their decision-making may become more affect-driven and less deliberative, making impulse buying more likely [16]. Therefore, examining PE is essential for understanding how emotionally immersive live streaming environments translate platform stimuli into impulsive purchasing responses within the S-O-R structure.

Among the strongest emotional predictors of IB is PE. Emotional arousal, especially when positive, has been widely recognized as a critical driver of unplanned purchases. Chung et al. (2017) describe IB as an irrational response fueled by heightened emotional states, while Sohn and Lee (2016) emphasize that emotional experiences are central to triggering impulsive purchases [54], [55]. Research in live streaming commerce consistently supports a positive relationship between PE and IB [11], [17], [56]. Enjoyment stimulates emotional reactions that facilitate impulsive actions [52]. For instance, high levels of enjoyment triggered by mobile augmented reality applications or engaging websites are linked to increased impulsive buying behavior [53], [57].

Lee et al. (2023) further found that consumers experiencing intense enjoyment and delight are more likely to overspend, as their emotional engagement can impair rational decision-making [58], [59]. Thus, when consumers find live streaming commerce enjoyable, they become more vulnerable to making impulsive purchases [60]. In summary, PE functions as a powerful emotional response to environmental stimuli,

ultimately driving IB behavior [61]. Based on these insights, the following hypothesis is proposed:

H4: Perceived enjoyment positively affects impulse buying.

2.7 Self-Control

Self-control (SC) refers to an individual's capacity to normalize internal emotions, behaviors, and impulses to achieve desired outcomes [62], [63]. SC contains the inhibition of automatic or habitual responses, allowing individuals to consciously deliberate, modify, or override behavioral tendencies in pursuit of longer-term goals [24], [25]. A classic method of assessing SC is the delay-of-gratification test, where individuals forgo immediate rewards to attain more significant future benefits [64]. Broader conceptualizations of SC include self-efficacy, self-regulation, inhibitory control, ego strength, and willpower [65]. Notably, SC stabilizes after early childhood, remaining relatively constant through adolescence and adulthood unless disrupted by major life events [66], [67]. Nonetheless, Baumeister et al. (2006) highlight that regular physical and cognitive training exercises can strengthen SC and reduce impulsive buying behaviors over time [24].

Additionally, SC plays a key role in shaping consumer reactions to strong marketing stimuli [68]. SC manifests in consumer behavior as either restraint or impulsivity [69], with spending and eating commonly cited as areas where many individuals struggle to resist temptation [70]. Rational consumers are characterized by their ability to balance SC against the impulse to acquire desirable products [71].

As Robert and Manolis (2012) explain, self-monitoring, ego depletion, and goal conflict are integral to exercising SC and resisting impulsive tendencies [72]. When the desire for immediate gratification overwhelms willpower, it is more likely for a person to engage in IB and less likely to consider future consequences [72], [73]. SC is thus considered a "cold process" cognitive system capable of regulating impulsive behaviors [74]. Numerous studies consistently demonstrate a negative relationship between SC and IB, whereby high SC correlates with reduced IB tendencies [72], [73], [75], [76]. Conversely, individuals with low SC exhibit greater susceptibility to IB and often incur higher associated financial losses [1], [51]. In today's e-commerce-driven era, where consumers are continually bombarded with advertising stimuli, SC is increasingly vital for resisting temptation and avoiding financial difficulties [77], [78]. Consequently, the study proposes the following hypothesis:

H5a: Self-control negatively affects impulse buying.

Furthermore, the allure of immediate enjoyment often diminishes the appeal of long-term goals like saving money [25], [79]. However, SC can effectively moderate and regulate impulsive responses by controlling emotional arousal [49], [80], [81]. The degree of SC varies among individuals [82]. According to impulsiveness theory, individuals with stronger SC are better equipped to manage their emotions and behaviors, making them less prone to impulsive actions [83], [84]. Impulsive urges tend

to intensify among individuals with lower SC [49], making low SC a critical factor emotionally influencing IB behaviors [14], [79].

Recent research by Sun et al. (2023) identified SC as playing a negative moderating role in the relationship between positive emotions and impulsive behavior [1]. This aligns with emotion-cognitive theory, which posits that while humans react emotionally to stimuli, they also possess the capacity for cognitive regulation [85]. However, some studies have reported insignificant moderating effects of SC on the link between PE and IB behavior [22], [52]. Given the limited research and conflicting findings, further exploration into SC’s moderating role is warranted. Accordingly, this study proposes:

H5b: *Self-control negatively moderates the relationship between perceived enjoyment and impulse buying, such that the relationship is weaker when self-control is highly in place.*

Figure 1 depicts the research model.

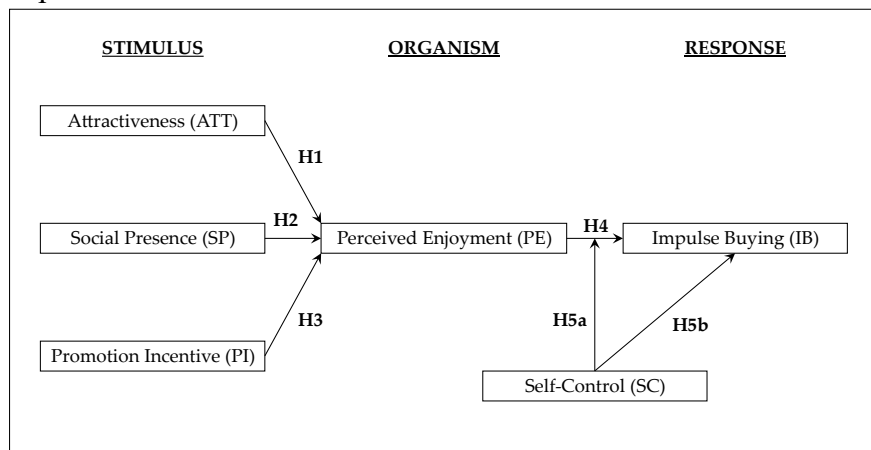


Figure 1. Research model

3. METHOD

3.1 Collection of Data and Sampling Procedure

This study focused on Malaysian individuals who had recently participated in live streaming commerce and engaged in unplanned purchases through such platforms. To identify suitable participants, a judgmental sampling approach (classified under non-probability sampling) was applied.

Data were collected via an online survey hosted on Google Forms. To confirm respondent eligibility, three screening questions were incorporated. These questions aimed to verify the respondent's Malaysian nationality, prior engagement with live streaming commerce, and frequency of impulse purchases made through this medium. A total of 368 responses were initially obtained. However, after a pre-screening process to eliminate poor-quality data, (such as straight-line answering patterns) 35 responses were discarded, yielding a final dataset of 333 valid responses.

To confirm the adequacy of the sample size, the study utilized G*Power software for statistical power analysis [86]. Using the "F tests" function with 0.95 power level, a significance level (α) of 0.05, and a medium effect size, the number of predictors was set to five, corresponding to the five independent variables in the proposed model. The analysis established that a minimum of 138 respondents were needed to achieve sufficient statistical power. Since the final sample consists of 333 respondents, it exceeds the minimum requirement and is therefore considered adequate for robust statistical analysis.

3.2 Survey Instrument

The survey questionnaire was organized into three distinct sections: a pre-screening section, Section A, and Section B.

The pre-screening section included three questions to verify the respondents' eligibility based on nationality, prior experience with live streaming commerce, and history of unplanned purchases. Section A gathered information such as gender, age, education level, and income. Section B focused on measuring the factors influencing impulse buying behavior.

All items in Section B were assessed using a five-point Likert scale, ranging from "strongly disagree" to "strongly agree." A total of 26 measurement items (adapted from established studies) were used to assess the constructs of interest, as shown in Table 1.

Table 1. Measurement items

Constructs	Items
Attractiveness <i>adapted from Lee and Chen (2021) [17]</i>	
ATT1	The live streamer gives me a good feeling.
ATT2	The live streamer is attractive.
ATT3	The live streamer catches my attention.
ATT4	I feel the live streamer is friendly.
ATT5	I feel the live streamer is likable.
Social Presence <i>adapted from Zheng et al. (2023) [20]</i>	
SP1	There is a sense of personal connection when watching live streaming commerce.
SP2	There is a sense of humanity when watching live streaming commerce.
SP3	There was a kind of human warmth when watching live streaming commerce.
SP4	There is a human sensitivity when watching live streaming commerce.
Promotion Incentive <i>adapted from Wang et al. (2024) [39]</i>	
PI1	The price discount in the live streaming commerce makes me feel like saving money.
PI2	Living with the live streaming commerce platform to grab the activity makes me feel more affordable.
PI3	I feel benefited from the rebates recommended by the live streaming commerce platform.
Perceived Enjoyment <i>adapted from Lee and Chen (2021) [17]</i>	
PE1	Shopping with live streaming commerce is exciting.
PE2	Shopping with live streaming commerce is enjoyable.
PE3	Shopping with live streaming commerce is interesting.
PE4	I found my watching to live streaming commerce is fun.
PE5	Purchasing with live streaming commerce is fun for its own sake.
Self-Control <i>adapted from Gulfraz et al. (2022) [15]</i>	
SC1	I can resist the temptation to achieve my budget goals.
SC2	Having objectives related to spending is important to me.
SC3	I often delay actions until I have carefully considered the consequences of my purchase decision.
SC4	I can work effectively toward long-term financial goals.
SC5	If anyone asks me where you spent money, I know how to respond.
SC6	I carefully consider my needs before making purchases.
Impulse Buying <i>adapted from Li et al. (2020) [13]</i>	
IB1	I always have the impulse to buy a product immediately when I see it on live streaming commerce.
IB2	I always have the impulse to buy some unplanned products that I did not intend to buy.
IB3	I have an impulse to consume on live streaming commerce.

3.3 Demographic Profile of Respondents

Table 2 outlines the demographic characteristics of the 333 valid respondents who participated in the study. A majority of the participants were female (62.2%), while male respondents accounted for 37.8% of the sample. In terms of age distribution, the 21–25 age group comprised the largest segment (38.1%), whereas the 46–50 age group represented the smallest proportion (2.7%).

With regard to educational attainment, more than half of the respondents (52.6%) held a bachelor's degree. As for purchasing behavior, 46.0% reported making unplanned purchases through live streaming commerce two to three times per month, while 37.5% indicated engaging in such purchases once a month.

Table 2. Respondents' demographic

	Demographic	Frequency	Percentage
Gender	Male	126	37.8
	Female	207	62.2
Age	20 or below	11	3.3
	21-25	127	38.1
	26-30	99	29.8
	31-35	41	12.3
	36-40	20	6
	41-45	16	4.8
	46-50	9	2.7
	51 or above	10	3
Employment Status	Employed	167	50.2
	Self-employed	42	12.6
	Student	115	34.5
	Unemployed	9	2.7
Education Level	Primary School	1	0.3
	Secondary School	56	16.8
	STPM/ Foundation/ Diploma	92	27.6
	Bachelor's Degree	175	52.6
	Master's Degree	7	2.1
	Ph.D.	2	0.6
How often do you buy unplanned products from live streaming commerce?	Never	0	0
	Rarely (Once a month or less)	125	37.5
	Sometimes (2-3 times a month)	153	46.0
	Often (Once a week)	42	12.6
	Frequently (2-3 times a week)	12	3.6
	Always (4 or more times a week)	1	0.3

4. ANALYSIS OF DATA

4.1 Measurement Model

To check for the presence of common method variance (CMV), this study conducted Harman's single-factor test. The results revealed that the first factor reported for less than 50% of the total variance, suggesting that CMV is not an issue. In addition, the PLS marker variable technique was used to further evaluate the risk of CMV [87], [88]. The inclusion of a marker variable with three associated items had no impact on the significance of path coefficients in the baseline model, confirming that CMV does not significantly compromise the study's validity.

In Table 3, all constructs demonstrated composite reliability (CR) values above the 0.6 threshold [89], indicating adequate internal consistency. Although four indicators — ATT4 (0.677), ATT5 (0.703), PE4 (0.684), and PE5 (0.702) — presented outer loadings below 0.708, literature suggests that indicators within the 0.40 to 0.70 range should only be removed if doing so substantially enhances CR or average variance extracted (AVE) values [90], [91]. In this study, both CR and AVE for the constructs ATT and PE exceeded their respective thresholds of 0.6 and 0.5, justifying the retention of these indicators.

Moreover, all remaining item loadings were above 0.708, further supporting indicator reliability. In addition, all AVE values were above the 0.5 threshold [90], [92], confirming the model's convergent validity.

Table 3. Loadings, CR and AVE

Constructs	Items	Loadings	CR	AVE
ATT	ATT1	0.833	0.868	0.568
	ATT2	0.792		
	ATT3	0.754		
	ATT4	0.677		
	ATT5	0.703		
SP	SP1	0.852	0.872	0.631
	SP2	0.773		
	SP3	0.828		
	SP4	0.719		
PI	PI1	0.850	0.859	0.670
	PI2	0.790		
	PI3	0.814		
PE	PE1	0.763	0.858	0.549
	PE2	0.789		
	PE3	0.759		
	PE4	0.684		
	PE5	0.702		

Constructs	Items	Loadings	CR	AVE
SC	SC1	0.925	0.967	0.829
	SC2	0.920		
	SC3	0.903		
	SC4	0.913		
	SC5	0.905		
	SC6	0.898		
IB	IB1	0.953	0.964	0.900
	IB2	0.950		
	IB3	0.942		

Both the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio of correlations were applied to check for discriminant validity [92], [93]. As presented in Table 4, the square root of each construct's AVE (displayed as bold diagonal values) exceeds the corresponding inter-construct correlations (off-diagonal elements), thereby satisfying the guidelines for discriminant validity [92]. Further confirmation is provided by the HTMT ratio, which evaluates the degree of similarity between constructs. All HTMT values fall below the recommended threshold of 0.85, indicating that discriminant validity is not compromised, as shown in Table 5 [93], [94].

Table 4. Testing of discriminant validity (Fornell and Larcker criterion)

	ATT	IB	PE	PI	SC	SP
ATT	0.754					
IB	0.049	0.948				
PE	0.679	0.147	0.741			
PI	0.552	0.096	0.589	0.818		
SC	-0.032	-0.771	-0.087	-0.009	0.911	
SP	0.633	0.068	0.627	0.434	-0.053	0.795

Table 5. Testing of discriminant validity (HTMT ratio of correlations)

	ATT	IB	PE	PI	SC	SP
ATT						
IB	0.082					
PE	0.841	0.172				
PI	0.700	0.116	0.753			
SC	0.073	0.809	0.108	0.048		
SP	0.767	0.080	0.771	0.543	0.075	

4.2 Structural Model

Evaluation of the inner VIF values (Variance Inflation Factor) revealed that all indicators scored below 3.3, confirming the non-existence of lateral multicollinearity issues [90], [95]. The structural model was evaluated using SmartPLS 4 [96], applying bootstrapping with 5000 subsamples to generate t-statistics. Given the directional nature of all hypotheses, a one-tailed test was conducted.

The results, summarized in Table 6, indicate that ATT ($\beta = 0.344, t = 5.335, p < 0.001$), SP ($\beta = 0.291, t = 3.419, p < 0.001$), and PI ($\beta = 0.272, t = 4.543, p < 0.001$) each had a significant positive influence on PE. Additionally, both PE ($\beta = 0.084, t = 2.491, p < 0.01$) and SC ($\beta = -0.752, t = 24.457, p < 0.001$) significantly influenced IB. As a result, hypotheses H1 through H5a were supported. However, the interaction effect between PE and SC (PE \times SC) was not statistically significant ($\beta = -0.038, t = 0.890, p = 0.187$), providing no support for hypothesis H5b. In terms of explanatory power, the model accounted for 57.7% of the variance in PE ($R^2 = 0.577$) and 60.1% of the variance in IB ($R^2 = 0.601$) (see Figure 2). Both R^2 values exceeded the threshold of 0.26, suggesting the model demonstrates substantial predictive accuracy [97].

Table 6. PLS Path analysis

Hypotheses	β	SE	t value	f square	Supported
H1: ATT \rightarrow PE	0.344	0.065	5.335 **	0.141	Yes
H2: SP \rightarrow PE	0.291	0.085	3.419 **	0.118	Yes
H3: PI \rightarrow PE	0.272	0.060	4.543 **	0.120	Yes
H4: PE \rightarrow IB	0.084	0.034	2.491 *	0.017	Yes
H5a: SC \rightarrow IB	-0.752	0.031	24.457 **	1.223	Yes
H5b: PE \times SC \rightarrow IB	-0.038	0.042	0.890	0.002	No

Note: ** $p < 0.001$, * $p < 0.01$ (one-tailed test)

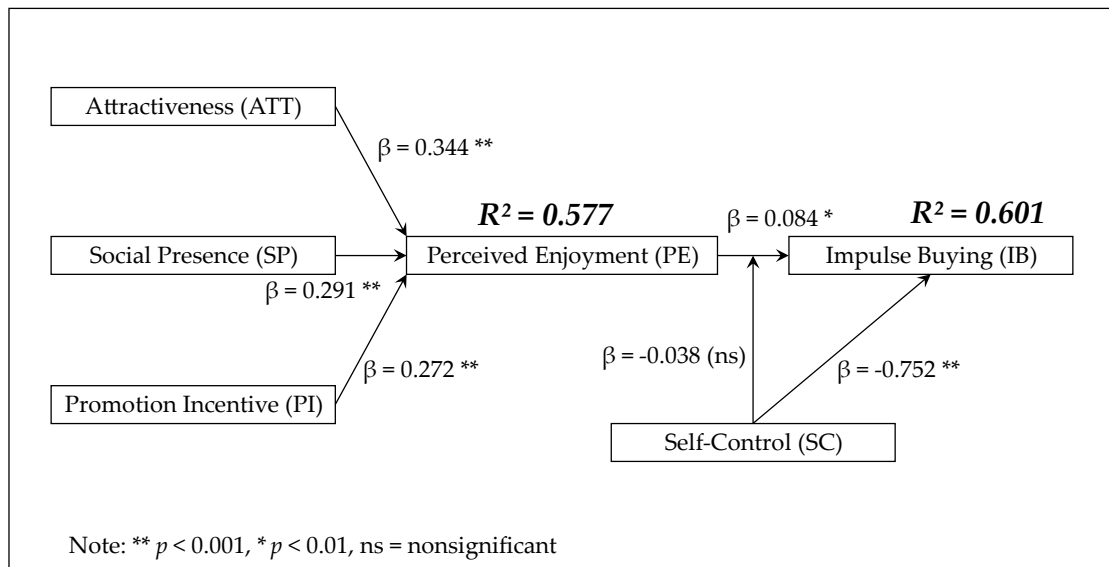


Figure 2. Results of analysis

5. DISCUSSION

The results of this study signify that ATT exerts a substantial positive influence on PE, consistent with prior studies which suggest that appealing visuals capture attention, produce positive emotional responses, and enhance viewer satisfaction [10], [33]. Among the three stimulus variables assessed, ATT yielded the highest path coefficient and t-statistic, highlighting its key role in shaping consumer reactions. This underlines the importance for marketers to strategically prioritize visual and personal appeal when designing live-streaming content. The findings suggest that visually appealing streamers can create a more engaging and enjoyable viewing experience. When viewers experience heightened enjoyment, their perception of the promoted product improves, leading to engagement in impulsive purchasing.

Further, the study confirms that SP significantly contributes to PE, supporting earlier findings that interactive and engaging environments amplify enjoyment in live-streaming contexts [11], [37]. This is in line with Zhu et al. (2023), who found a positive association between SP and viewer enjoyment [21]. In the context of live streaming, the platform's dynamic and interactive nature fosters a strong sense of SP, resembling face-to-face interactions, which significantly enhances enjoyment [38]. This environment cultivates emotional resonance, enhances engagement, and builds a sense of virtual community. When viewers feel emotionally connected through these shared experiences, their enjoyment is heightened, especially when collective emotions such as excitement or joy are displayed by both streamers and viewers.

Similarly, PI also demonstrated a positive effect on PE. This suggests that individuals derive increased pleasure when they believe they are obtaining added value, such as purchasing at a discounted rate or receiving more for the same price. This outcome aligns with previous literature [44], [98], which emphasizes the role of perceived value in enhancing emotional satisfaction, enjoyment, and ultimately shaping consumer intent.

The support for Hypothesis 4 (H4), which posits that PE positively affects IB, reinforces the idea that PE is a key driver of unplanned purchases. This finding is consistent with previous research [11], [17], [56]. Additionally, Do et al. (2020) found that the PE derived from mobile augmented reality applications contributes to IB in the tourism sector [53]. This indicates that, for Malaysian consumers, environments that evoke positive emotional states are more likely to stimulate IB behavior. In the context of live streaming commerce, PE can positively influence impulse buying because the platform's design intentionally blends entertainment, social interaction, and time-sensitive offers. These features heighten emotional engagement and create immersive experiences that reduce consumers' cognitive deliberation, making them more likely to respond affectively rather than rationally. As a result, higher levels of enjoyment increase approach-oriented tendencies and the likelihood of impulsive buying.

In line with Hypothesis 5a (H5a), SC was found to negatively predict IB. This outcome resonates with past research [51], [72], [75], suggesting that individuals with higher SC are more capable of resisting impulsive tendencies. On the other hand, individuals with lower SC are more vulnerable to unplanned consumption, which may lead to financial difficulties. Thus, fostering SC could serve as a protective mechanism against impulsive spending, particularly in emotionally stimulating digital commerce platforms.

Contrary to Hypothesis 5b (H5b), however, SC did not significantly moderate the relationship between PE and IB. This aligns with findings by Chen et al. (2022), who also observed no significant moderating effect of SC in social media use [52]. These results suggest that the intense enjoyment derived from live-streaming content may temporarily override consumers' internal self-regulatory processes. In other words, even individuals with higher SC may not be immune to the influence of emotionally engaging live-streaming experiences. Overall, these results imply that when Malaysian consumers experience high levels of enjoyment in live streaming commerce, they are inclined to involve in impulse buying behavior, irrespective of their level of self-control.

6. CONCLUSION

6.1 Theoretical Implications

This study implements the S-O-R model to explore the psychological mechanisms driving IB among Malaysian consumers in live streaming context. Drawing from existing literature, the research integrates attractiveness, social presence, and promotional incentives as external stimuli. These elements influence the internal affective state (perceived enjoyment) which in turn prompts impulsive consumer responses. Moreover, the personality trait self-control is incorporated both as a direct predictor of IB and as a moderator of the PE–IB relationship, thereby addressing a theoretical gap in prior research, specifically in the context of live streaming commerce.

The study's findings reinforce the robustness of the S-O-R model in explaining consumer behavior within interactive digital commerce environments. ATT, SP, and PI were each found to exert a positive influence on PE, which subsequently drives IB behavior. This confirms that emotionally stimulating features of live streaming significantly affect internal states that trigger impulsive purchasing. Furthermore, this study identifies a strong negative relationship between SC and IB, indicating that individuals with lower SC are more prone to IB.

However, the data reveal that SC does not significantly moderate the link between PE and IB. This suggests that when consumers derive high enjoyment from live-streaming interactions, their baseline level of self-control may no longer be a strong determinant of purchasing behavior. These results echo findings by Chen et al. (2022), who proposed that heightened emotional arousal can temporarily impair consumers' self-regulation capacity [52].

The immersive and affectively rich environment appears capable of weakening the influence of self-regulatory mechanisms, leading consumers to act on impulse, regardless of their usual character. Thus, this study contributes to the literature by highlighting not only the utility of the S-O-R model in emerging digital commerce formats, but also the conditional limitations of self-control as a buffer against emotionally driven consumption.

6.2 Managerial Implications

Overall, this study highlights those three key stimuli (ATT, SP, and PI) drive customer IB in Malaysia's live streaming commerce through their influence on PE. These insights offer a framework for e-commerce marketers to design more emotionally engaging strategies aimed at increasing consumer engagement and expanding market share.

To begin with, ATT emerged as the most impactful stimulus. This highlights the need for marketers to prioritize viewer engagement by creating visually appealing and emotionally stimulating live content. While physical attractiveness of streamers can draw attention, long-term engagement depends on the uniqueness and creativity of the presentation. Streamers and content creators should develop distinctive, high-quality content that evokes curiosity and enjoyment to effectively differentiate themselves in a saturated marketplace.

Second, the role of SP highlights the importance of interactive and community-driven elements in live streaming. A vibrant, responsive streaming environment can elevate emotional connection and viewer satisfaction. Streamers should adopt communication styles that are not only dynamic but also personalized, such as addressing frequent viewers by name or responding in real time to comments. These practices help foster a sense of social closeness and belonging, which can heighten PE and, consequently, encourage IB.

Third, PI was shown to positively influence emotional engagement by creating a perception of value and urgency. Marketers can leverage this by aligning promotions with culturally significant shopping occasions like the Double 11 sales, mid-month promotions, or festive season campaigns. Customizing promotional tactics to suit the preferences of different platform users will enhance relevance and perceived value, thereby amplify emotional responses and increase the likelihood of impulse purchases. More broadly, the S-O-R model draws attention to the necessity of designing content that fosters emotional resonance. By strategically deploying ATT, SP, and PI, marketers can generate compelling consumer experiences that stimulate PE and drive purchase behavior.

The study also stresses the importance of SC in consumer behavior. A significant negative relationship between SC and IB suggests that consumers with higher self-regulation are less prone to impulsive purchases. From a consumer perspective, this study serves as a cautionary note on the risks of overconsumption. Strengthening SC can contribute to improved financial well-being, allowing consumers to make more

sustainable purchasing decisions [99]. While cultivating self-discipline is challenging, public campaigns, educational initiatives, or budgeting tools can help consumers develop healthier purchasing habits.

Interestingly, the study reveals that SC does not significantly moderate the PE–IB relationship. In emotionally charged environments like live streaming, enjoyment appears to override self-regulatory tendencies. This finding serves as both an opportunity and a caution for marketers. On one hand, emotionally rich content can effectively drive purchasing across a broad spectrum of consumers. On the other, there is a responsibility to ensure that such strategies do not exploit consumers' emotional susceptibility. Ethical marketing in live streaming commerce should aim to balance commercial objectives with the promotion of sustainable consumption, particularly in societies that place high value on collective well-being and long-term customer trust.

6.3 Limitations and Future Suggestions

There are several limitations in this work that should be acknowledged. First, the research sample comprised the general Malaysian population without segmenting participants by generational cohorts. However, IB tendencies can vary significantly across generations due to differing perceptions of enjoyment influenced by factors such as ATT, SP, and PI. This implies that certain generational cohorts may contribute disproportionately to overall IB. For example, Generation Z consumers are more inclined to engage in impulsive buying compared to other generations [100]. Consequently, the findings of this research may not fully capture the nuances of IB behavior within any particular age group.

Second, this study does not distinguish between different types of live streaming commerce. Notably, there are significant distinctions between social media-based live streaming commerce (e.g., Facebook, TikTok) and e-commerce platform-based live streaming commerce (e.g., Shopee, Lazada). Social media platforms tend to foster a more interactive and community-oriented experience, characterized by higher levels of ATT and SP. In contrast, e-commerce platforms often prioritize transaction efficiency, offering greater PI incentives. Since this study does not categorize these live streaming formats separately, it may be challenging to explain the specific effects of each type.

Future research should address the gaps as highlighted above. First, the participants could be segmented by age or generation which could uncover how different demographic groups perceive and respond to stimuli in live commerce contexts. Second, comparative studies across platform types could be conducted, particularly between social media-driven and e-commerce-oriented environments. This would offer deeper insights into the mechanisms by which platform design and user experience influence IB. Such investigations would not only enhance the theoretical understanding of consumer behavior in digital commerce but also inform the development of more tailored marketing strategies across different consumer segments and technological ecosystems.

7. REFERENCES

- [1] J. Sun, T. Li, and S. Sun, “Factors affecting users’ impulse purchases in online group buying: online consumer reviews, countdowns and self-control,” *Asia Pacific Journal of Marketing and Logistics*, vol. 36, no. 1, pp. 224–240, 2024.
- [2] J. Ming, Z. Jianqiu, M. Bilal, U. Akram, and M. Fan, “How social presence influences impulse buying behavior in live streaming commerce? The role of S-O-R theory,” *International Journal of Web Information Systems*, vol. 17, no. 4, pp. 300–320, 2021.
- [3] Y. Huang and L. Suo, “Factors Affecting Chinese Consumers’ Impulse Buying Decision of Live Streaming E-Commerce,” *Asian Social Science*, vol. 17, no. 5, pp. 16–32, 2021.
- [4] C. Y. Chou, J. Chen, and S. Lin, “Value cocreation in livestreaming and its effect on consumer-simulated experience and continued use intention,” *International Journal of Consumer Studies*, vol. 46, no. 6, pp. 2183–2199, 2022.
- [5] J. A. Pranata, M. R. Putra Riyanto, S. Hendrawan, and W. Gunadi, “The Effect of Hedonic Motivation and IT Affordance on Impulsive Buying Decisions in Social Commerce: TikTok,” *International Journal of Electronic Commerce Studies*, vol. 15, no. 2, pp. 63–102, 2024.
- [6] S. Obukhovich, J. Sipilä, and A. Tarkiainen, “Post-purchase effects of impulse buying: A review and research agenda,” *Journal of Consumer Behaviour*, vol. 23, no. 3, pp. 1512–1527, 2024.
- [7] A. U. Zafar, J. Shen, M. Shahzad, and T. Islam, “Relation of impulsive urges and sustainable purchase decisions in the personalized environment of social media,” *Sustainable Production and Consumption*, vol. 25, pp. 591–603, 2021.
- [8] L. Peng, G. Lu, K. Pang, and Q. Yao, “Optimal farmer’s income from farm products sales on live streaming with random rewards: Case from China’s rural revitalisation strategy,” *Computers and Electronics in Agriculture*, vol. 189, p. 106403, 2021.
- [9] P.-S. Lo, Y. K. Dwivedi, G. Wei-Han Tan, K.-B. Ooi, E. Cheng-Xi Aw, and B. Metri, “Why do consumers buy impulsively during live streaming? A deep learning-based dual-stage SEM-ANN analysis,” *Journal of Business Research*, vol. 147, pp. 325–337, 2022.
- [10] M. Kim and H.-M. Kim, “What online game spectators want from their twitch streamers: Flow and well-being perspectives,” *Journal of Retailing and Consumer Services*, vol. 66, p. 102951, 2022.
- [11] C. Huo, X. Wang, M. W. Sadiq, and M. Pang, “Exploring Factors Affecting Consumer’s Impulse Buying Behavior in Live-Streaming Shopping: An Interactive Research Based Upon SOR Model,” *Sage Open*, vol. 13, no. 2, pp. 1–15, 2023.

- [12] F. Liu, Y. Wang, X. Dong, and H. Zhao, “Marketing by live streaming: How to interact with consumers to increase their purchase intentions,” *Frontiers in Psychology*, vol. 13, pp. 1–21, 2022.
- [13] M. Li, T. Zhao, E. Huang, and J. Li, “How Does a Public Health Emergency Motivate People’s Impulsive Consumption? An Empirical Study during the COVID-19 Outbreak in China,” *International Journal of Environmental Research and Public Health*, vol. 17, no. 14, p. 5019, 2020.
- [14] A. J. Sultan, J. Joireman, and D. E. Sprott, “Building consumer self-control: The effect of self-control exercises on impulse buying urges,” *Marketing Letters*, vol. 23, no. 1, pp. 61–72, 2012.
- [15] M. B. Gulfraz, M. Sufyan, M. Mustak, J. Salminen, and D. K. Srivastava, “Understanding the impact of online customers’ shopping experience on online impulsive buying: A study on two leading E-commerce platforms,” *Journal of Retailing and Consumer Services*, vol. 68, p. 103000, 2022.
- [16] K. L. Tang, P. M. Tan, and Y. J. Tham, “Impulse Buying in Live Stream Based on the Stimulus-Organism-Response Framework,” *Jurnal Pengurusan*, vol. 66, pp. 67–69, 2022.
- [17] C.-H. Lee and C.-W. Chen, “Impulse Buying Behaviors in Live Streaming Commerce Based on the Stimulus-Organism-Response Framework,” *Information*, vol. 12, no. 6, p. 241, 2021.
- [18] R. J. Donovan and J. R. Rossiter, “Store Atmosphere: An Environmental Psychology Approach,” *Journal of Retailing*, vol. 58, no. 1, pp. 34–57, 1982.
- [19] R. Gatautis, E. Vitkauskaite, A. Gadeikiene, and Z. Piligrimiene, “Gamification as a Mean of Driving Online Consumer Behaviour: SOR Model Perspective,” *Engineering Economics*, vol. 27, no. 1, pp. 90–97, 2016.
- [20] S. Zheng, J. Chen, J. Liao, and H.-L. Hu, “What motivates users’ viewing and purchasing behavior motivations in live streaming: A stream-streamer-viewer perspective,” *Journal of Retailing and Consumer Services*, vol. 72, p. 103240, 2023.
- [21] P. Zhu, Z. Liu, X. Li, X. Jiang, and M. X. Zhu, “The influences of livestreaming on online purchase intention: examining platform characteristics and consumer psychology,” *Industrial Management & Data Systems*, vol. 123, no. 3, pp. 862–885, 2023.
- [22] Y. Wu, L. Xin, D. Li, J. Yu, and J. Guo, “How does scarcity promotion lead to impulse purchase in the online market? A field experiment,” *Information & Management*, vol. 58, no. 1, p. 103283, 2021.
- [23] R. I. Rodrigues, P. Lopes, and M. Varela, “Factors Affecting Impulse Buying Behavior of Consumers,” *Frontiers in Psychology*, vol. 12, p. 697080, 2021.
- [24] R. F. Baumeister, K. D. Vohs, and D. M. Tice, “The Strength Model of Self-Control,”

- Current Directions in Psychological Science*, vol. 16, no. 6, pp. 351–355, 2007.
- [25] A. Jain, Dr. S. Srivastava, and A. Shukla, “Self-control and compulsive buying behavior: The mediating role of ill-being perception,” *Cogent Business & Management*, vol. 10, no. 3, p. 2286673, 2023.
- [26] T. Teo and J. Noyes, “An assessment of the influence of perceived enjoyment and attitude on the intention to use technology among pre-service teachers: A structural equation modeling approach,” *Computers & Education*, vol. 57, no. 2, pp. 1645–1653, 2011.
- [27] F. D. Davis, R. P. Bagozzi, and P. R. Warshaw, “Extrinsic and Intrinsic Motivation to Use Computers in the Workplace¹,” *Journal of Applied Social Psychology*, vol. 22, no. 14, pp. 1111–1132, 1992.
- [28] B. H. K. Dwitya and A. Hartono, “An Investigation of Live Stream Shopping Via TikTok: The Role of Perceived Enjoyment in Impulsive Buying,” *Journal of Economics, Management and Trade*, vol. 29, no. 12, pp. 54–65, 2023.
- [29] C. Razafinandrasana and D. Tamara, “Exploring The Factors Which Impact Impulse Purchase Intention in TikTok Live Streaming Shopping in Indonesia,” *International Journal of Electronic Commerce Studies*, vol. 15, no. 2, pp. 21–62, 2024.
- [30] Y. Guo, K. Zhang, and C. Wang, “Way to success: Understanding top streamer’s popularity and influence from the perspective of source characteristics,” *Journal of Retailing and Consumer Services*, vol. 64, p. 102786, 2022.
- [31] L. Peng, G. Cui, Y. Chung, and W. Zheng, “The Faces of Success: Beauty and Ugliness Premiums in e-Commerce Platforms,” *Journal of Marketing*, vol. 84, no. 4, pp. 67–85, 2020.
- [32] J. Liao, K. Chen, J. Qi, J. Li, and I. Y. Yu, “Creating immersive and parasocial live shopping experience for viewers: the role of streamers’ interactional communication style,” *Journal of Research in Interactive Marketing*, vol. 17, no. 1, pp. 140–155, 2023.
- [33] X. Li, D. Huang, G. Dong, and B. Wang, “Why consumers have impulsive purchase behavior in live streaming: the role of the streamer,” *BMC Psychology*, vol. 12, no. 1, p. 129, 2024.
- [34] L. A. Albertson, “Review Essay : Trying To Eat an Elephant The Social Psychology of Telecommunications, by John Short, Ederyn Williams, and Bruce Christie. London: John Wiley, 1976,” *Communication Research*, vol. 7, no. 3, pp. 387–400, 1980.
- [35] C. Herrando, J. Jiménez-Martínez, and M. J. Martín-De Hoyos, “Passion at first sight: how to engage users in social commerce contexts,” *Electronic Commerce Research*, vol. 17, no. 4, pp. 701–720, 2017.

- [36] J. Chen and J. Liao, “Antecedents of Viewers’ Live Streaming Watching: A Perspective of Social Presence Theory,” *Frontiers in Psychology*, vol. 13, p. 839629, 2022.
- [37] B. Liu, “How Social Presence Affects Viewers’ Impulse Buying Behavior in Live Streaming Commerce,” *Journal of Economics, Business and Management*, vol. 11, no. 3, pp. 100–112, 2023.
- [38] Y. Gu, X. Cheng, and J. Shen, “Design shopping as an experience: Exploring the effect of the live-streaming shopping characteristics on consumers’ participation intention and memorable experience,” *Information & Management*, vol. 60, no. 5, p. 103810, 2023.
- [39] L. Wang, R.-S. Zhang, and C.-X. Zhang, “Live streaming E-commerce platform characteristics: Influencing consumer value co-creation and co-destruction behavior,” *Acta Psychologica*, vol. 243, p. 104163, 2024.
- [40] T. Adelaar, S. Chang, K. M. Lancendorfer, B. Lee, and M. Morimoto, “Effects of Media Formats on Emotions and Impulse Buying Intent,” *Journal of Information Technology*, vol. 18, no. 4, pp. 247–266, 2003.
- [41] H.-C. Ko, “Social desire or commercial desire? The factors driving social sharing and shopping intentions on social commerce platforms,” *Electronic Commerce Research and Applications*, vol. 28, pp. 1–15, 2018.
- [42] U. Akram, P. Hui, M. Khan, C. Yan, and Z. Akram, “Factors Affecting Online Impulse Buying: Evidence from Chinese Social Commerce Environment,” *Sustainability*, vol. 10, no. 2, p. 352, 2018.
- [43] P. Chandon, B. Wansink, and G. Laurent, “A Benefit Congruency Framework of Sales Promotion Effectiveness,” *Journal of Marketing*, vol. 64, no. 4, pp. 65–81, 2000.
- [44] S. K. Sinha and P. Verma, “Impact of sales Promotion’s benefits on perceived value: Does product category moderate the results?,” *Journal of Retailing and Consumer Services*, vol. 52, p. 101887, 2020.
- [45] A. S. Muhammad, I. Adeshola, and L. Isiaku, “A mixed study on the ‘wow’ of impulse purchase on Instagram: insights from Gen-Z in a collectivistic environment,” *Young Consumers*, vol. 25, no. 1, pp. 128–148, 2024.
- [46] L. Ellis, A. W. Hoskin, and M. Ratnasingam, “Personality and Behavioral Factors,” in *Handbook of Social Status Correlates*, Elsevier, 2018, pp. 75–118.
- [47] P. Liu, J. He, and A. Li, “Upward social comparison on social network sites and impulse buying: A moderated mediation model of negative affect and rumination,” *Computers in Human Behavior*, vol. 96, pp. 133–140, 2019.
- [48] P. Singh, B. K. Sharma, L. Arora, and V. Bhatt, “Measuring social media impact on Impulse Buying Behavior,” *Cogent Business & Management*, vol. 10, no. 3, p.

- 2262371, 2023.
- [49] M. Friese and W. Hofmann, "Control me or I will control you: Impulses, trait self-control, and the guidance of behavior," *Journal of Research in Personality*, vol. 43, no. 5, pp. 795–805, 2009.
- [50] V. Shankar, J. J. Inman, M. Mantrala, E. Kelley, and R. Rizley, "Innovations in Shopper Marketing: Current Insights and Future Research Issues," *Journal of Retailing*, vol. 87, pp. S29–S42, 2011.
- [51] J. Nyrhinen, K. Lonka, A. Sirola, M. Ranta, and T. Wilska, "Young adults' online shopping addiction: The role of self-regulation and smartphone use," *International Journal of Consumer Studies*, vol. 47, no. 5, pp. 1871–1884, 2023.
- [52] S. Chen, K. Zhi, and Y. Chen, "How active and passive social media use affects impulse buying in Chinese college students? The roles of emotional responses, gender, materialism and self-control," *Frontiers in Psychology*, vol. 13, p. 1011337, 2022.
- [53] H.-N. Do, W. Shih, and Q.-A. Ha, "Effects of mobile augmented reality apps on impulse buying behavior: An investigation in the tourism field," *Heliyon*, vol. 6, no. 8, p. e04667, 2020.
- [54] N. Chung, H. G. Song, and H. Lee, "Consumers' impulsive buying behavior of restaurant products in social commerce," *International Journal of Contemporary Hospitality Management*, vol. 29, no. 2, pp. 709–731, 2017.
- [55] H.-K. Sohn and T. J. Lee, "Tourists' impulse buying behavior at duty-free shops: the moderating effects of time pressure and shopping involvement," *Journal of Travel & Tourism Marketing*, vol. 34, no. 3, pp. 341–356, 2017.
- [56] S.-C. Lin, H.-T. Tseng, F. Shirazi, N. Hajli, and P.-T. Tsai, "Exploring factors influencing impulse buying in live streaming shopping: a stimulus-organism-response (SOR) perspective," *Asia Pacific Journal of Marketing and Logistics*, vol. 35, no. 6, pp. 1383–1403, 2023.
- [57] J. Ingham, J. Cadieux, and A. Mekki Berrada, "e-Shopping acceptance: A qualitative and meta-analytic review," *Information & Management*, vol. 52, no. 1, pp. 44–60, 2015.
- [58] Y. Y. Lee, C. L. Gan, and T. W. Liew, "Rationality and impulse buying: Is your emotion a part of the equation?," *Computers in Human Behavior Reports*, vol. 12, p. 100337, 2023.
- [59] U. G. Cancellieri, I. Petruccelli, L. Cicero, A. Milani, F. Bonaiuto, and M. Bonaiuto, "Reputation and emotion: How the mind drives our food preferences and choices," *Food Quality and Preference*, vol. 101, p. 104637, 2022.
- [60] L. Xiang, X. Zheng, M. K. O. Lee, and D. Zhao, "Exploring consumers' impulse buying behavior on social commerce platform: The role of parasocial interaction,"

- International Journal of Information Management*, vol. 36, no. 3, pp. 333–347, 2016.
- [61] Z. Feng, A. Al Mamun, M. Masukujjaman, M. Wu, and Q. Yang, “Impulse buying behavior during livestreaming: Moderating effects of scarcity persuasion and price perception,” *Heliyon*, vol. 10, no. 7, p. e28347, 2024.
- [62] R. Schwarzer, “Health Self-Regulation, Motivational and Volitional Aspects of,” in *International Encyclopedia of the Social & Behavioral Sciences*, Elsevier, 2015, pp. 710–715.
- [63] R. Boat, T. Atkins, N. Davenport, and S. Cooper, “Prior self-control exertion and perceptions of pain and motivation during a physically effortful task,” in *Progress in Brain Research*, vol. 240, Elsevier, 2018, pp. 19–34.
- [64] S. J. Watson and T. L. Milfont, “A short-term longitudinal examination of the associations between self-control, delay of gratification and temporal considerations,” *Personality and Individual Differences*, vol. 106, pp. 57–60, 2017.
- [65] D. C. Shumack, J. M. Ogilvie, S. Smallbone, and E. L. Woodford, “Increasing Self-Control,” in *Toolkit for Working with Juvenile Sex Offenders*, Elsevier, 2014, pp. 427–447.
- [66] R. C. Meldrum, J. T. N. Young, and F. M. Weerman, “Changes in self-control during adolescence: Investigating the influence of the adolescent peer network,” *Journal of Criminal Justice*, vol. 40, no. 6, pp. 452–462, 2012.
- [67] S. Gil, “Personality and trauma-related risk factors for traumatic exposure and for posttraumatic stress symptoms (PTSS): A three-year prospective study,” *Personality and Individual Differences*, vol. 83, pp. 1–5, 2015.
- [68] X. Huang and R. Cai, “Does Product Semantics Matter in Stimulating Impulse Buying Behavior for Internet Products?,” *Frontiers in Psychology*, vol. 12, p. 676086, 2021.
- [69] C. S. Carver, “Impulse and Constraint: Perspectives From Personality Psychology, Convergence With Theory in Other Areas, and Potential for Integration,” *Personality and Social Psychology Review*, vol. 9, no. 4, pp. 312–333, 2005.
- [70] K. L. Haws, “Enhancing self-control in consumer decisions,” *Current Opinion in Psychology*, vol. 10, pp. 118–123, 2016.
- [71] K. Nagar, “Mediating effect of self-control between life satisfaction and counterfeit consumption among female consumers,” *Journal of Global Fashion Marketing*, vol. 7, no. 4, pp. 278–290, 2016.
- [72] J. A. Roberts and C. Manolis, “Cooking Up a Recipe for Self-Control: The Three Ingredients of Self-Control and its Impact on Impulse Buying,” *Journal of Marketing Theory and Practice*, vol. 20, no. 2, pp. 173–188, 2012.
- [73] G. R. Iyer, M. Blut, S. H. Xiao, and D. Grewal, “Impulse buying: a meta-analytic

- review,” *Journal of the Academy of Marketing Science*, vol. 48, no. 3, pp. 384–404, 2020.
- [74] S. Wang, Y. Liu, Y. Du, and X. Wang, “Effect of the COVID-19 Pandemic on Consumers’ Impulse Buying: The Moderating Role of Moderate Thinking,” *International Journal of Environmental Research and Public Health*, vol. 18, no. 21, p. 11116, 2021.
- [75] R. Efendi, S. Indartono, and S. Sukidjo, “The Mediation of Economic Literacy on the Effect of Self Control on Impulsive Buying Behaviour Moderated by Peers,” *International Journal of Economics and Financial Issues*, vol. 9, no. 3, pp. 98–104, 2019.
- [76] Y. Wang, J. Pan, Y. Xu, J. Luo, and Y. Wu, “The Determinants of Impulsive Buying Behavior in Electronic Commerce,” *Sustainability*, vol. 14, no. 12, p. 7500, 2022.
- [77] M. Ranta, G. Silinskas, and T.-A. Wilska, “Young adults’ personal concerns during the COVID-19 pandemic in Finland: an issue for social concern,” *International Journal of Sociology and Social Policy*, vol. 40, no. 9/10, pp. 1201–1219, 2020.
- [78] T. Koskelainen, P. Kalmi, E. Scornavacca, and T. Vartiainen, “Financial literacy in the digital age—A research agenda,” *Journal of Consumer Affairs*, vol. 57, no. 1, pp. 507–528, 2023.
- [79] S. Li, P. Ren, M. M. Chiu, C. Wang, and H. Lei, “The Relationship Between Self-Control and Internet Addiction Among Students: A Meta-Analysis,” *Frontiers in Psychology*, vol. 12, p. 735755, 2021.
- [80] J. P. Tangney, R. F. Baumeister, and A. L. Boone, “High Self-Control Predicts Good Adjustment, Less Pathology, Better Grades, and Interpersonal Success,” *Journal of Personality*, vol. 72, no. 2, pp. 271–324, 2004.
- [81] R. S. Raghunathan, R. J. Musci, N. Knudsen, and S. B. Johnson, “What children do while they wait: The role of self-control strategies in delaying gratification,” *Journal of Experimental Child Psychology*, vol. 226, p. 105576, 2023.
- [82] D. T. D. De Ridder, G. Lensvelt-Mulders, C. Finkenauer, F. M. Stok, and R. F. Baumeister, “Taking Stock of Self-Control: A Meta-Analysis of How Trait Self-Control Relates to a Wide Range of Behaviors,” *Personality and Social Psychology Review*, vol. 16, no. 1, pp. 76–99, 2012.
- [83] G. Ainslie, “Specious reward: A behavioral theory of impulsiveness and impulse control.,” *Psychological Bulletin*, vol. 82, no. 4, pp. 463–496, 1975.
- [84] N. H. Frijda, K. R. Ridderinkhof, and E. Rietveld, “Impulsive action: emotional impulses and their control,” *Frontiers in Psychology*, vol. 5, p. 518, 2014.
- [85] S. Folkman, “Stress: Appraisal and Coping,” in *Encyclopedia of Behavioral Medicine*, M. D. Gellman and J. R. Turner, Eds., New York, NY: Springer New York, 2013, pp. 1913–1915.

- [86] H. Kang, “Sample size determination and power analysis using the G*Power software,” *Journal of Educational Evaluation for Health Professions*, vol. 18, p. 17, 2021.
- [87] M. Rönkkö and J. Ylitalo, “PLS marker variable approach to diagnosing and controlling for method variance,” in *32nd International Conference on Information Systems*, Shanghai, 2011, pp. 1–16.
- [88] M. K. Lindell and D. J. Whitney, “Accounting for common method variance in cross-sectional research designs.,” *Journal of Applied Psychology*, vol. 86, no. 1, pp. 114–121, 2001.
- [89] R. P. Bagozzi and Y. Yi, “On the evaluation of structural equation models,” *Journal of the Academy of Marketing Science*, vol. 16, no. 1, pp. 74–94, 1988.
- [90] J. F. Hair, G. T. M. Hult, C. M. Ringle, and M. Sarstedt, *A primer on partial least squares structural equation modeling (PLS-SEM)*, Third edition. Thousand Oaks: SAGE Publications, Incorporated, 2022.
- [91] J. F. Hair, W. C. Black, B. J. Babin, and R. E. Anderson, *Multivariate data analysis*, Eighth edition. Australia Brazil Mexico South Africa Singapore United Kingdom United States: Cengage, 2019.
- [92] C. Fornell and D. F. Larcker, “Evaluating Structural Equation Models with Unobservable Variables and Measurement Error,” *Journal of Marketing Research*, vol. 18, no. 1, pp. 39–50, 1981.
- [93] J. Henseler, C. M. Ringle, and M. Sarstedt, “A new criterion for assessing discriminant validity in variance-based structural equation modeling,” *Journal of the Academy of Marketing Science*, vol. 43, no. 1, pp. 115–135, 2015.
- [94] R. B. Kline, *Principles and Practice of Structural Equation Modeling*, Fifth edition. New York: Guilford, 2023.
- [95] A. Diamantopoulos and J. A. Siguaw, “Formative Versus Reflective Indicators in Organizational Measure Development: A Comparison and Empirical Illustration,” *British Journal of Management*, vol. 17, no. 4, pp. 263–282, 2006.
- [96] C. M. Ringle, S. Wende, and J.-M. Becker, *SmartPLS 4*. (2024). [Online]. Available: <https://www.smartpls.com>
- [97] J. Cohen, *Statistical Power Analysis for the Behavioral Sciences*, Routledge, 2013.
- [98] N. Büyükdağ, A. N. Soysal, and O. Kitapci, “The effect of specific discount pattern in terms of price promotions on perceived price attractiveness and purchase intention: An experimental research,” *Journal of Retailing and Consumer Services*, vol. 55, p. 102112, 2020.
- [99] A. O. I. Hoffmann and L. Risse, “Do good things come in pairs? How personality traits help explain individuals’ simultaneous pursuit of a healthy lifestyle and financially responsible behavior,” *Journal of Consumer Affairs*, vol. 54, no. 3, pp.

1082–1120, 2020.

- [100] E. Djafarova and T. Bowes, “‘Instagram made Me buy it’: Generation Z impulse purchases in fashion industry,” *Journal of Retailing and Consumer Services*, vol. 59, p. 102345, 2021.