

Enhancing Impulse Buying Among Generation Z Through Social Presence in E-Commerce Live Streaming

Andika Andika ¹, Mohamad Najmudin ¹, Atika Aini Nasution ²,
Tiara Nur Anisah ¹, Della Nanda Luthfiana ¹, Nadia Nadia ¹

¹ Faculty of Economics and Business, Janabadra University, Yogyakarta, Indonesia

² Faculty of Economics and Business, Battuta University, North Sumatera, Indonesia

Abstract – The rapid development of digital landscapes has significantly transformed consumer shopping behavior, making e-commerce integral to daily life in Indonesia. Generation Z, born and raised in the digital era, represents a substantial segment of e-commerce users with impulsive buying tendencies. Although e-commerce is widely adopted, there is still a limited insight into how social presence (SP) during live streaming affects impulsive purchasing behaviors within Generation Z. This research offers an in-depth examination of how SP within e-commerce live streaming platforms influences impulsive purchasing behavior, framed by the Social Presence Theory. Data were collected through online surveys from 263 Generation Z respondents with live streaming e-commerce shopping experience. The proposed hypotheses were tested through structural equation modeling. The findings reveal that the presence of livestream hosts and their product demonstrations significantly improve perceived usefulness and positive emotions, both of which spark impulsive buying urges and actions. The study also highlights that the presence of other viewers positively affects perceived usefulness but not positive emotions.

These findings emphasize the need for integrating social components into live streaming to foster interactive and emotionally gratifying shopping experiences. The research contributes to the academic field and offers practical insights for developing more effective digital marketing strategies.

Keywords – Social presence, impulse buying behavior, e-commerce live streaming, Generation Z, perceived usefulness.

1. Introduction

Indonesia, with the fourth largest population globally, reaching 279.6 million people in May 2024 [1], demonstrates significant social and economic dynamics. The gender distribution in the country is almost balanced between men and women [2]. Internet penetration in Indonesia is substantial, with 185.3 million users, although approximately 93.4 million remain without Internet access. Social media is immensely influential, with 139 million active users utilizing platforms such as Facebook, Instagram, and TikTok [2], reflecting Indonesia's evolving digital behavior.

The rapid advancement of digital technologies has introduced substantial shifts across numerous areas of life, particularly in how consumers engage with shopping. E-commerce has become a central element of the everyday lives of Indonesian consumers, functioning as the primary option for their shopping activities [3]. Generation Z, defined as individuals born between 1997 and 2012 [4], represents a key demographic group in digital consumer behavior analysis, with a population of 74.93 million, approximately 27.94% of the total population [5]. This cohort, raised during the digital era, demonstrates advanced technological and social media proficiency. Nearly 54% of e-commerce consumers in Indonesia belong to Generation Z, and 6.5% actively participate as e-commerce players [5].

DOI: 10.18421/TEM141-22

<https://doi.org/10.18421/TEM141-22>

Corresponding author: Andika Andika,
Faculty of Economics and Business, Janabadra University,
Yogyakarta, Indonesia.


Email: andika@janabadra.ac.id

Received: 11 June 2024.

Revised: 29 November 2024.

Accepted: 20 December 2024.

Published: 27 February 2025.

 © 2025 Andika Andika et al.; published by UIKTEN. This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivs 4.0 License.

The article is published with Open Access at <https://www.temjournal.com/>

As reported by the APJII (Indonesian Internet Service Providers Association) [6], Generation Z constitutes 34.40% of Indonesia's Internet users, with strong participation in e-commerce shopping [7]. Driven by accessible information and attractive offers, this generation tends to make more impulse purchases than their predecessors [8]. These behavioral patterns make Generation Z an essential demographic segment for further research on online shopping behavior [9], particularly in understanding the factors influencing impulse buying decisions.

The acceleration of e-commerce growth was significantly influenced by the COVID-19 pandemic, which prompted a shift from physical stores to online platforms [10]. In April 2020, online sales experienced a sharp surge, increasing by 480% compared to January 2020 [11]. Between 2018 and 2024, the e-commerce sector is projected to grow eightfold, with total revenues rising from \$12.2 billion to \$94.9 billion [12]. This upward trajectory is predicted to sustain market dominance, driven by continuous innovations from leading platforms, such as Shopee, Tokopedia, TikTok, and Lazada, which consistently adapt to meet the needs of a digitally oriented consumer base. Among these platforms, Shopee is the preferred e-commerce platform for Generation Z [13] due to its engaging shopping experience and competitive offers.

Although the growth of e-commerce with digital marketing provides numerous benefits, particular challenges remain. One notable issue is the need for more social and human elements in the online shopping experience [14], resulting in lower engagement levels among Generation Z compared to traditional markets [15]. This gap increases perceived purchase risks and fosters uncertainty among Generation Z consumers, thereby hindering purchasing activity [16]. The lack of direct interaction also limits their access to personalized recommendations, a critical factor influencing purchasing decisions [17]. Furthermore, the inability to convey products' emotional value through e-commerce platforms may undermine consumer trust and reduce impulse buying tendencies [18]. While e-commerce offers convenience and accessibility, the need for an engaging and satisfying shopping experience remains a pressing challenge.

Overcoming barriers to online shopping in e-commerce can be achieved by incorporating human and social elements into the shopping process, such as real-time interactions between customers and sellers through chat or video calls. This approach enables more personalized experiences and allows customers to ask questions and receive immediate feedback [19]. Virtual and augmented reality technologies also contribute significantly by enabling customers particularly technologically adept Generation Z to interact with products more engagingly, thus boosting purchase confidence [20].

In the ever-evolving digital age, innovation in e-commerce is critical for creating immersive shopping experiences tailored to the preferences of Generation Z, who prioritize interactive and satisfying engagements.

Live streaming has emerged as a notable innovation in e-commerce, serving as an effective marketing medium. This approach overcomes geographic and temporal limitations, enhancing social presence (SP) in online transactions [21]. SP arises from real-time interactions between hosts and viewers, significantly boosting consumer engagement and building trust in the showcased products [22]. Personalized communication further strengthens emotional connections between consumers and brands, influencing purchase intent and fostering customer loyalty [23]. For Generation Z, who has been immersed in the digital age, this interactive shopping experience holds particular value. They seek products that fulfill both social and emotional needs [24]. SP in live streaming has the potential to drive impulse purchases by creating an emotionally engaging and urgent environment that compels viewers to act [25]. Live product demonstrations conducted by hosts foster a sense of immediacy and relatability [26], encouraging spontaneous purchasing behavior.

Although the pivotal role of Generation Z is live streaming-driven, e-commerce is widely recognized [27], a comprehensive exploration of the dynamics of SP in their interactions still needs to be developed. Existing studies on Generation Z's interaction with emerging technologies, such as live-streaming e-commerce, particularly concerning their SP and psychological dimensions, still need to be completed [28]. Generation Z is critical in driving the growth of e-commerce and is expected to shape the future of online shopping [29]. While a significant body of literature has investigated the relationship between SP and consumer behavior in e-commerce live streaming [29], [30], there still needs to be a greater understanding of how specific SP elements individually or collectively influence impulse buying behavior. Previous research has often treated SP as either a unified construct [29], [31] or separate components [25], [32] typically focusing on the SP of live streamers, audiences, platforms, and the concept of telepresence [33].

In contrast, the SP of the product is often overlooked [34]. When shopping online, consumers cannot immediately see, taste, or try products [35]. Therefore, the information conveyed through product presentations in live streaming serves as an essential clue for consumers in assessing product quality and making purchasing decisions. Moreover, previous research has generally relied on the impulse buying urge as a proxy for actual purchases [30], [36].

The impulse buying urge does not always lead to actual impulse purchases [37], and the transition from impulse buying urge to actual impulse buying can be understood through behavioral circuitry [38].

This research addresses the current gap by investigating how SP in live streaming e-commerce impacts impulsive purchasing behavior among Generation Z, utilizing Social Presence Theory as the analytical framework [39]. This approach was chosen for its ability to explain how SP affects consumer perceptions and interactions in a live-streaming environment [22]. Social Presence Theory facilitates a more detailed analysis of how different SP elements such as live streamer-audience interactions and product presentations cultivate engagement and connection, subsequently influencing consumer behavior. The examination focuses on how elevated SP enhances perceived usefulness and positive emotions, which may trigger impulsive buying urges that evolve into actual purchase behaviors. Various previous studies have successfully applied Social Presence Theory in multiple contexts, such as education [40] and online shopping behavior [41], reinforcing this theory's relevance and validity in this study. Through the application of Social Presence Theory, this study seeks to elucidate how perceived usefulness and positive emotions mediate the relationship between SP and impulse buying among Generation Z. The findings are anticipated to make a significant contribution to academic discussions and marketing strategies in the digital age, offering valuable insights for more precise and effective marketing approaches. Consequently, this study enhances the theoretical understanding of SP in digital consumer behavior while providing actionable recommendations for marketers to design more engaging e-commerce live-streaming experiences and effectively shape consumer behavior.

2. Literature Review

The literature review examines the elements shaping impulsive purchasing decisions in the context of e-commerce live streaming, particularly within Generation Z. Three pivotal themes are explored: (1) e-commerce live streaming as a vibrant and transforming platform, (2) impulse buying behavior and the affective-cognitive framework as lenses to comprehend consumer urges, and (3) the Theory of SP, which highlights social connections that boost engagement and purchasing behavior in Generation Z.

2.1. E-commerce Live Streaming

Live streaming refers to content that allows individuals to share real-time activities, such as playing musical instruments, performing dances, or gaming [42].

In its early stages, live-streaming platforms were primarily dedicated to gaming and entertainment [43]. With advancements in technology and changing consumer preferences, live streaming has become a vital element of marketing strategies, leading to the emergence of e-commerce live streaming [44]. This form of social commerce offers a more interactive and dynamic experience [45]. E-commerce live streaming can be divided into two categories: Dedicated platforms with live streaming capabilities, such as Shopee Live and Tokopedia Live [46], and social media platforms incorporating e-commerce features, like Facebook Live and TikTok [47].

Live-streaming platforms are more effective than conventional website-based e-commerce at triggering impulse purchases among Generation Z due to their authentic and socially engaging experiences [9]. Streamers can display products in real-time, provide detailed information, and try products live, creating visual demonstrations that increase customer engagement and trust [48]. In addition, customer interaction in live-streaming sessions creates a more cohesive community [49]. As a result, e-commerce live streaming delivers a more immersive, genuine, and visually dynamic shopping experience, drawing in more potential buyers and boosting impulsive buying behavior among Generation Z. The uniqueness of live and real-time interactions makes live streaming e-commerce a significant innovation in modern digital commerce. Although this topic is increasingly attracting the attention of researchers, existing research focuses more on customer engagement and purchase intent. At the same time, the impulse buying aspect, especially for Generation Z, still needs adequate attention [45], [50], [51]. Thus, this research examines the literature concerning impulse buying in e-commerce live streaming, explicitly focusing on Generation Z.

2.2. Impulse Buying and the Affective-Cognitive Models

Stern [52] defines impulse buying as an unplanned, spontaneous decision to make a purchase, reflecting a form of unintentional consumer behavior. Although often equated with unplanned purchases, they have essential differences [53]. Unplanned purchases do not always involve strong intentions and positive emotions, as with impulsive purchases [54]. Generation Z consumers frequently encounter strong temptations and exhibit difficulties in resisting impulsive tendencies [55]. Amos *et al.* [56] outline three critical characteristics of impulsive buying: It is spontaneous, disregards potential costs or consequences, and is driven by a strong desire for personal satisfaction. Current research focuses more on the reasons behind impulse buying urges [34].

Purchase decisions involve cognitive and affective processes [57]. The cognitive approach analyzes product attributes, while the affective approach involves direct emotional reactions [58]. The cognitive system plays a role in self-control, while the affective system reduces this ability [59]. Impulse buying is frequently characterized as a hedonistic behavior driven by positive emotions and minimal rational consideration [60]. Casado-Aranda *et al.* [61] suggest that impulsive buying is more closely related to hedonistic motivations than utilitarian ones.

Complex online shopping demands a re-evaluation of impulse buying mechanisms [34]. Studies show that online purchases tend to be more rational due to high uncertainty and risk [62]. Even though they are encouraged to buy impulsively, consumers still judge product quality cognitively [34]. Research shows a correlation between impulse purchases and cognitive factors such as site ease of use [63], site quality [64], and risk perception [65]. Pham *et al.* [66] affirm that the perception of usefulness also influences impulsiveness. Measuring these behaviors is difficult due to memory bias and participant responses [67]. The impulse buying urge for an impulsive purchase is a reliable predictor of such behavior and is frequently employed as a proxy indicator [34], [49]. Studies have examined the impact of traditional e-commerce external stimuli and personal characteristics, such as materialism and FOMO (Fear of Missing Out), on impulse buying urges [68], [69], [70]. However, some researchers point out that impulse buying urges do not always result in actual purchasing behavior [37], [71]. The transition from impulse buying urge to purchasing behavior is understood through complex behaviors [38]. The distinct features of live-streaming e-commerce may present challenges to conventional e-commerce insights, particularly in the context of impulsive buying behavior among Generation Z. Additional research is required to investigate how emotional and cognitive elements shape the urges and impulsive buying behaviors within live-streaming e-commerce environments.

2.3. Theory of Social Presence (SP)

The theory of social presence emphasizes the role of interpersonal interactions and the capacity of communication media to transmit social signals, fostering intimacy and psychological closeness [39]. In the beginning, scholars believed that SP levels were primarily shaped by the technical features of the media, such as the capacity to deliver both visual and verbal signals [39]. Media such as video conferencing and phone calls are more effective at increasing SP than email [72]. Earlier research conceptualized SP as a single-dimensional construct, evaluated by the medium's effectiveness in transmitting warmth and fostering psychological nearness [73].

However, this approach needs to be narrower, given the complexity of today's digital interactions, where users communicate with other community members, creating a shared psychological presence [74].

Recent research recognizes social existence as a multidimensional concept [75]. Singh *et al.* [76] identify the three elements of existence in online education: cognitive, pedagogical, and social. Algharabat and Rana [77] explored Two Dimensions of social commerce: The SP of websites and consumer reviews. Li *et al.* [32] formulated a three-dimensional framework for e-commerce live streaming, encompassing the SP of streamers, viewers, and the live streaming environment. Ming *et al.* [25] introduce a four-dimensional model: The SP of streamers, viewers, platforms, and telepresence. However, the literature often ignores the social existence of the product [34]. In e-commerce live streaming, consumers psychologically engage with displayed products, fostering a sense of product presence [22]. Hence, this research introduces a model with three critical dimensions of SP in e-commerce live streaming: the live streamers, the viewers, and the products being showcased.

A live streamer's SP is characterized by the audience's perception that the streamer shares the same space with them, enabling viewers to observe the streamer's facial expressions, body language, surroundings, and voice in real-time [34]. This sensory stimulus creates the illusion of face-to-face interaction, reinforcing the closeness and comfort of the audience through the humorous or warm communication style that the streamer uses, thereby reducing psychological distance [21]. In e-commerce live streaming, streamers present and test products while offering personalized services, such as demonstrating products upon request and showcasing the results [31]. Real-time interactions such as chatting, sending likes, and tipping strengthen the streamer's social presence, increasing viewers' shopping pleasure [78]. A solid social presence enhances not only the sense of connection with the streamer but also boosts the perceived effectiveness and usability of the live streaming experience [79].

The audience's social presence in e-commerce live streaming is defined by the visibility and participation of other individuals within the online community, as demonstrated through viewer interactions [80]. Real-time comment systems on platforms such as Shopee significantly promote communication and interaction, enabling users to post and view comments directly on the screen while watching live streams, thus providing a more engaging and immersive experience [79]. Viewers can communicate with each other via text in chat channels, making the online shopping experience more social and interactive [81].

This interaction between audiences allows for a deeper understanding of the product through word of mouth, which creates a more comprehensive shared shopping experience [82]. When customers engage in virtual shopping activities and become aware of the SP of other viewers, they tend to experience increased perceptions of usefulness and positive feelings.

In e-commerce live streaming, a product's SP is reflected in consumers' ability to interact with it directly, bypassing intermediaries, as streamers showcase the product live in real time [83]. Streamers show products from different angles, demonstrate how to use them, and explain their functions directly, allowing consumers to imagine themselves using the product [84]. This experience resembles a real-world product trial and is essential in improving the perception of product usefulness [85].

Live demonstrations by streamers help consumers understand how products work and benefit more clearly, reduce perceived risks related to product quality, and increase confidence in purchasing decisions [86]. Real-time physical interactions and the accompanying psychological connections foster a sense of immediacy, enhancing the perceived realism of the product [87]. Consumers who are more confident in the quality and usability of products through direct demonstrations tend to experience more intense positive emotions. From a pleasant and interactive shopping experience, these positive effects increase consumers' satisfaction and enthusiasm for the product, which can encourage impulsive purchasing behavior [88].

Figure 1 shows the proposed model, supported by the reviewed literature.

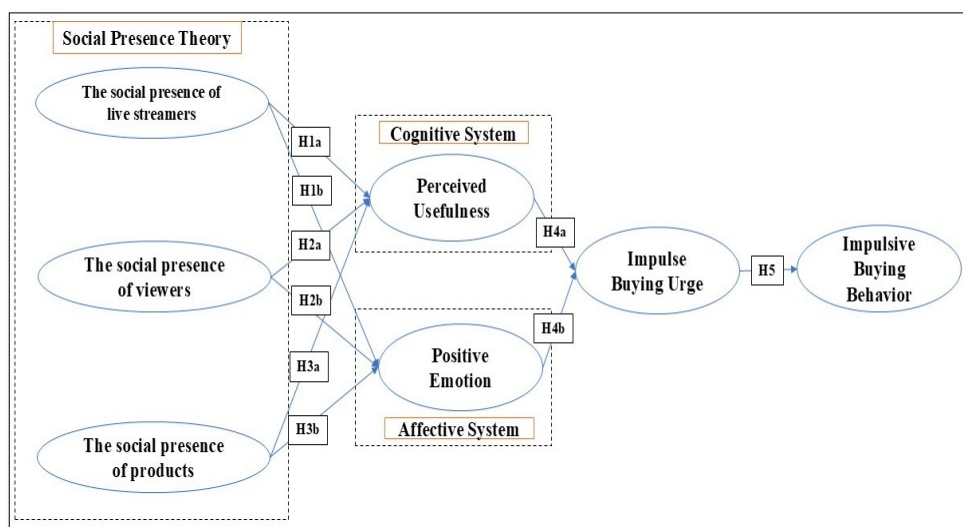


Figure 1. Proposed model framework

Hypothesis 1: The presence of live streamers has a significant impact on perceived usefulness (a) and positive emotions (b).

Hypothesis 2: The presence of fellow viewers significantly influences perceived usefulness (a) and positive emotional responses (b).

Hypothesis 3: The presence of the product being showcased has a significant impact on perceived usefulness (a) and positive emotions (b).

Hypothesis 4a: Perceived usefulness has a significant influence on the impulse buying urge.

Hypothesis 4b: Positive emotions significantly influence impulse buying urge.

Hypothesis 5: The impulse buying urge significantly impacts impulsive buying behavior.

3. Method

A quantitative approach was employed to examine how SP and related factors influence impulse buying behavior in e-commerce live streaming among Indonesia's Generation Z.

The study used an online survey and PLS-SEM analysis to validate the proposed connections. Each methodological detail is further elaborated to uphold precision and transparency in gathering and interpreting data.

3.1. Questionnaire Design

Survey items were adapted from previously validated scales in earlier studies. The items used to assess the SP of live streamers and other viewers in e-commerce were adapted from Ming *et al.* [25] and Li *et al.* [49], each consisting of three questions.

Three items were adapted from Zhang *et al.* [34] to measure the product's social presence.

Perceived usefulness was evaluated with five items adapted from Lee and Chen [89], while positive emotions were assessed using a four-item scale developed by Xu *et al.* [90]. The item to measure the impulse buying urge is adapted from Lee and Chen [91] with four questions.

In contrast, impulse buying behavior is measured using items from Cavazos-Arroyo and Máñez-Guaderrama [92], which consists of three questions. All constructs were assessed using a five-point Likert scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree). The online survey was conducted in Indonesia, with all items translated from English to Indonesian for better contextual fit.

An initial trial was conducted with 30 respondents who had previously shopped via e-commerce live streaming to assess the instrument's validity and reliability. The trial aimed to identify comprehension issues with the survey items and verify the translations' clarity and precision. The test results showed that most respondents could understand the survey items well, and only a slight language adjustment was needed to improve clarity. Following the trial, exploratory factor analysis (EFA) was conducted to confirm that the items accurately reflected the intended constructs. In addition, confirmatory factor analysis (CFA) was employed to validate the factor structure of the items. The reliability of the constructs was assessed using Cronbach's alpha, ensuring internal consistency across the items within each construct. The analysis results confirmed that all constructs demonstrated high validity and reliability, with Cronbach's alpha values surpassing 0.70, ensuring adequate internal consistency. Thus, this survey instrument is feasible for collecting primary research data.

3.2. Data Collection Procedures

The survey was administered online using Google Forms, a widely utilized data collection tool in Indonesia, accessible via a shared link. Using a snowball sampling method, the questionnaire was disseminated through social media channels like WhatsApp, encouraging respondents to share it with their friends and family. The target sample comprised Generation Z consumers who had previously purchased through e-commerce live-streaming platforms. Accordingly, the survey included questions to verify respondents' age and their experience of buying on such platforms. Participants were requested to reflect on their shopping experiences on live-streaming platforms and respond to questions based on those experiences.

The minimum sample size was calculated based on Chin's method [93], which emphasizes statistical power analysis and was executed using the G*Power software.

The study indicated that at least 193 respondents were required to attain a statistical power of 0.80. Data collection via the questionnaire took place from April 14 to May 28, 2024, yielding 294 responses.

Subsequently, the reactions of individuals, not Generation Z, who had never purchased e-commerce live-streaming platforms or provided invalid data (e.g.: + outliers) were excluded. Finally, as many as 263 valid responses were maintained.

Among the 263 Generation Z respondents, 34% were male, and 66% were female. Most respondents have an undergraduate education level (51%), followed by high school (44%) and postgraduate (5%). Based on income level, 65% of respondents have a monthly income of less than Rp. 1,500,000, then 21% of respondents have an Rp income. 1,500,000-2,500,000, 8% of respondents earn Rp. 2,500,000-3,500,000, and 6% of respondents earn more than Rp. 3,500,000. Regarding their experience in e-commerce live streaming, the most frequently used platforms are TikTok (66%), Shopee (19%), Facebook Live (10%), and Tokopedia (5%). Based on the frequency of purchases, as many as 87% of respondents have purchased products through live streaming 1 to 3 times, 12% have made purchases 4 to 6 times, and 1% have purchased more than six times.

3.3. Measures

Partial least squares structural equation modeling (PLS-SEM) was employed to analyze survey data for several reasons. Firstly, PLS-SEM is ideal for managing complex research frameworks [94]. In addition, PLS-SEM offers high flexibility in sample size, making it practical for small and large samples [95]. This method also excels in developing and expanding theories [94]. Furthermore, PLS-SEM can overcome abnormal data distribution, which is often found in social science research [96]. The PLS approach was the estimation method to develop a complex model and extend social presence theory. Adhering to the two-stage analysis approach [97], SmartPLS 4.0 was used to evaluate the measurement and structural models and conduct hypothesis testing in the model.

4. Findings

This section presents key findings, including data quality checks, model validation, and hypothesis testing results, confirming the study's framework and variable relationships.

4.1. Examination of Common Method Bias

Data collection from a single source at one point introduces the potential risk of common method bias (CMB), which may affect study consistency [98].

The study used the Harman one-factor test [97] to overcome this and identify CMB threats. A threshold of 50 percent was applied for a single-factor variance.

The analysis showed that one common factor explained 49.808 percent of the variance, indicating the absence of CMB in the data. In addition, the problem of multicollinearity was examined by measuring the Variance Inflation Factor (VIF). The ideal VIF value should be below 3 [99]. All VIF values in this study were between 1,476 and 2,975, confirming no multicollinearity problem.

4.2. Evaluation of the Measurement Model

The measurement model was evaluated by assessing its composite reliability, convergent validity, and discriminant validity.

As indicated in Table 1, the composite reliability scores for all constructs exceed the recommended threshold of 0.70, adhering to the guidelines provided by Hair *et al.* [96]. Item loadings ranged from 0.807 to 0.903, and the average variance extracted (AVE) for each construct exceeded 0.50, confirming convergent validity. The Heterotrait-Monotrait Ratio (HTMT) was applied to assess discriminant validity. As noted by Henseler *et al.* [100], HTMT values should remain below 1 to maintain validity, mainly when item loadings are high. In Table 1, all Heterotrait-Monotrait Ratio (HTMT) values are below the critical threshold of 1, confirming that discriminant validity requirements are met.

Table 1. Measurement model analysis results

Variables	Loading	CR	AVE	HTMT							
				IPB	PE	PU	SPP	SPS	SPV	IBU	
IPB	0.846-0.868	0.898	0.745								
PE	0.854-0.903	0.931	0.771	0.759							
PU	0.815-0.872	0.922	0.704	0.745	0.790						
SPP	0.847-0.903	0.908	0.767	0.710	0.627	0.749					
SPS	0.829-0.889	0.892	0.735	0.757	0.765	0.790	0.801				
SPV	0.807-0.832	0.871	0.693	0.669	0.602	0.775	0.883	0.852			
IBU	0.838-0.883	0.924	0.754	0.978	0.735	0.758	0.685	0.789	0.663		

4.3. Structural Model

The structural model was assessed using critical criteria such as the determination coefficient (R2), cross-validation redundancy (Q2), PLS prediction, and standardized root mean square residual (SRMR). According to Table 2, the adjusted R2 results indicate that the model variation for IPB, PE, PU, and IBU accounted for 71%, 46%, 55.4%, and 52.6%, respectively. IPB, PU, and IBU variables are categorized as moderate, while PE is classified as low. For endogenous structures, Q² values greater than 0 are considered low, 0.25 is moderate, and 0.50 is considered high [96]. The Q² values for the endogenous variables in this study—IPB, PE, PU, and IBU—were recorded at 0.523, 0.348, 0.382, and 0.39, respectively. This shows that IPB is categorized as high, while PE, PU, and IBU are classified as moderate.

Previous research has demonstrated that models with specific explanatory powers may yield different levels of predictive accuracy [101]. This study employed a PLS approach incorporating out-of-sample predictions [102]. Using SmartPLS 4, the predictive strength of the proposed framework is evaluated. As indicated in Table 2, the analysis shows that most RMSE and MAE values in the PLS model are lower than those in the LM model, reflecting the moderate predictive capability of the framework [96]. The SRMR measures the average discrepancy between observed and predicted correlation matrices, serving as an absolute goodness-of-fit index. According to Henseler *et al.* [94], an SRMR value below 0.1 is acceptable. Table 2 reports an SRMR value of 0.095, which falls below the 0.1 threshold, suggesting an adequate model fit.

Table 2. Results of R2, Q2, PLS predict, and SRMR tests

Variables	R2	Q2	SRMR	Item	PLS Predict			
					RMSE PLS	MAE PLS	RMSE LM	MAE LM
Impulsive Purchase Behavior	0.711	0.523	0.095	IPB1	1.035	0.794	1.058	0.759
				IPB2	0.862	0.674	0.847	0.588
				IPB3	0.976	0.787	1.01	0.768
Positive Emotion	0.46	0.348		PE1	0.828	0.612	0.812	0.602
				PE2	0.876	0.665	0.91	0.681
				PE3	0.908	0.694	0.929	0.704
				PE4	0.861	0.659	0.865	0.67
Perceived Usefulness	0.554	0.382		PU1	0.865	0.625	0.909	0.653
				PU2	0.78	0.586	0.819	0.6
				PU3	0.741	0.545	0.777	0.574
				PU4	0.749	0.551	0.757	0.549
				PU5	0.802	0.595	0.794	0.582
Impulse Buying Urge	0.526	0.39		IBU1	0.921	0.7	0.96	0.673
				IBU2	0.958	0.739	0.988	0.717
			IBU3	0.881	0.684	0.903	0.669	
			IBU4	0.876	0.688	0.89	0.661	

4.4. Outcomes of Hypothesis Testing

This research employed Smart PLS Version 4 to examine the hypotheses, with the findings presented in Table 3. Among the nine hypotheses tested, eight were supported, with all confirmed paths demonstrating significance at a p-value below 0.02. The SP of the streamer had a significant effect on perceived usefulness and positive emotions, supporting H1a and H1b.

The presence of other viewers positively influenced perceived usefulness but did not impact substantially positive emotions, confirming H2a while rejecting H2b. The SP of the product substantially affects the perceived usefulness and positive emotions, supporting H3a and H3b. Perceived usefulness and positive emotions significantly influence the impulse buying urge, supporting H4a and H4b. Impulse buying urge significantly influences impulse buying behavior, supporting H5.

Table 3. Hypothesis testing results

Latent Variable		Orig. Sample (O)	StdDev	T values	P values	Supported (Yes/No)
H1a	SPS -> PU	0.356	0.069	5.157	0.000	Yes
H1b	SPS -> PE	0.522	0.098	5.351	0.000	Yes
H2a	SPV -> PU	0.217	0.081	2.684	0.007	Yes
H2b	SPV -> PE	0.022	0.102	0.213	0.831	No
H3a	SPP -> PU	0.483	0.067	7.242	0.001	Yes
H3b	SPP -> PE	0.42	0.08	5.245	0.019	Yes
H4a	PU -> IBU	0.42	0.08	5.245	0.000	Yes
H4b	PE -> IBU	0.363	0.085	4.277	0.000	Yes
H5	IBU -> IPB	0.843	0.02	41.532	0.000	Yes

5. Discussion

Hypothesis 1a, b: The findings indicate that the SP of streamers in e-commerce live streaming significantly enhances perceived usefulness and evokes positive emotions among Generation Z in Indonesia, supporting H1a and H1b. Previous research by Li *et al.* [32], Andika *et al.* [85], and Zhang *et al.* [34] similarly highlights that the appeal of streamers positively influences usefulness perceptions and enhances emotional engagement, making viewers more receptive to recommendations and product information. A solid SP not only improves platform usefulness but also heightens positive emotional responses, potentially driving impulsive purchasing behaviors.

Multiple factors contribute to this effect among Indonesia’s Generation Z. First, this generation is deeply connected to digital technologies and highly values real-time interactions, making them more responsive to live streaming formats that closely mimic face-to-face communication. Second, Indonesia’s cultural emphasis on social interaction and community aligns seamlessly with the interactive features of live streaming. Third, Generation Z in Indonesia prioritizes authenticity, favoring influencers or streamers who offer relatable, real-time product demonstrations over polished, traditional advertising. These combined factors make live streaming, emphasizing SP, particularly impactful in shaping this generation’s emotional and cognitive responses.

For Indonesia's Generation Z, known for their preference for authentic, immersive experiences, these findings highlight the importance of incorporating SP into marketing strategies to enhance user experience and foster customer loyalty. This study supports social presence theory and provides valuable insights for developing more effective e-commerce strategies that resonate with this dynamic group of consumers.

Hypothesis 2a, b: This research indicates that the presence of other viewers in e-commerce live streaming significantly enhances users' perceptions of usefulness (H2a) but has no notable effect on their emotional responses (H2b). The findings align with Chong *et al.* [103] and Fu and Hsu [104], who emphasize that SP fosters an immersive shopping experience, enhancing consumer engagement through viewer interactions and improving perceived usefulness. The active participation of other viewers simulates a shared experience, which supports Generation Z—who are familiar with social media platforms and peer-driven content—in navigating the shopping process more confidently and effectively. This collaborative environment enhances the functionality of live streaming platforms, as users benefit from real-time feedback and insights from fellow viewers. The absence of a significant effect on positive emotions suggests that while SP strengthens cognitive aspects like usefulness, it may require additional elements, such as content quality or personalization, to evoke emotional responses [32]. Given that Indonesian Generation Z places high value on personalized experiences and entertainment, social interactions alone may not evoke emotional engagement without content that is both captivating and tailored to individual preferences. Therefore, marketing strategies targeting Generation Z should acknowledge that enhanced social interaction positively influences usefulness. A more comprehensive approach—incorporating emotional elements like personalized content and influencer relatability—is essential to deliver a fulfilling and emotionally engaging shopping experience.

Hypothesis 3a, b: The results of this research confirm that the SP of products in e-commerce live streaming significantly influences perceived usefulness (H3a) and evokes positive emotional responses (H3b) among Generation Z consumers in Indonesia. The SP of the product, created through interactive presentations and engaging visualizations during live streaming sessions, enhances consumer perception of the product's usability by providing detailed information and live demonstrations that can be accessed in real-time. The findings align with the work of Lee and Chen [91] and Zhang *et al.* [34], emphasizing the pivotal role of product SP in strengthening emotional and functional ties with consumers.

Critically, a robust SP of a product not only adds functional value by presenting clear and comprehensive information but also triggers a positive affinity by creating a pleasant and immersive shopping experience. During live streams, interactive exchanges between hosts and audiences reinforce emotional engagement, enhancing consumers' mood and purchase interest. The combined effect of heightened usefulness and positive emotions demonstrates that integrating SP into live-streaming marketing strategies can effectively influence purchasing decisions and reinforce customer loyalty, particularly among Generation Z, who are highly adaptive to technology and value interactive, personalized shopping experiences.

Hypothesis 4a, b: The findings of this research substantiate that the perceived usefulness (H4a) and positive emotional responses (H4b) derived from SP significantly impact the impulse buying urge among Generation Z in Indonesia. These findings are consistent with prior research by Andika *et al.* [85], Lee and Chen [91], and Lee *et al.* [36], which highlights the critical role of SP in enhancing perceived usefulness and evoking positive emotions, thereby significantly driving impulsive buying behaviors. Given the characteristics of Indonesian Generation Z, who are highly notably proficient in technology and active on social media, SP on e-commerce live streaming platforms is crucial in crafting an interactive and emotionally engaging shopping experience, further reinforcing the impulse to purchase. SP-driven real-time interactions and immediate feedback strengthen the connection between consumers and products, diminishing the distinction between virtual and physical shopping experiences. This heightens their emotional engagement and perceived product value. This demographic's preference for authentic and immersive experiences amplifies their susceptibility to impulse buying, as they tend to trust live-stream demonstrations and peer interactions during streams. These insights provide strategic value for e-commerce practitioners crafting experience-driven marketing strategies that enhance social interaction and drive sales conversions among this consumer segment. Furthermore, this study contributes to understanding consumer behavior's psychological and emotional dynamics in modern e-commerce.

Hypothesis 5: The present study affirms that the impulse buying urge significantly influences buying behavior among Generation Z in Indonesia. These results not only corroborate prior studies [105], [106] but also illuminate the intricacies of Generation Z's consumer behavior within a swiftly transforming digital landscape. In the contemporary interactive digital age, e-commerce live-streaming platforms provide a fluid and captivating shopping experience that effectively stimulates impulsive buying urges.

Indonesian Generation Z demonstrates a pronounced sensitivity to social media and digital content, making them particularly receptive to live-streaming commerce's immediacy and visual appeal. Critical factors such as real-time engagement, visual stimulation, and the sense of urgency fostered by the interaction among streamers, viewers, and featured products are instrumental in propelling impulse purchases. The dynamic nature of these platforms aligns with Generation Z's preference for concise, visually engaging content, intensifying the impulse to purchase with minimal deliberation. Furthermore, the cultural transition toward digital shopping in Indonesia, where convenience and immediate satisfaction are greatly esteemed, amplifies this conduct. This research underscores the necessity of comprehending the psychological and emotional catalysts underlying digital shopping, providing essential insights for marketers aiming to refine their approaches in Indonesia's rapidly evolving e-commerce environment.

6. Conclusion

This study examines the dynamics of SP in live-streaming e-commerce by categorizing it into three key dimensions: streamer presence, viewer involvement, and product representation. It analyzes how these dimensions influence impulse buying behavior, mediated by perceived usefulness and positive emotions, among Generation Z consumers in Indonesia. The results demonstrate that the SP of streamers and products significantly boosted perceived usefulness and positive emotional responses, which triggered impulsive buying urges and purchase behaviors. Meanwhile, the SP of other spectators only affects the perception of usefulness. These results highlight the critical role of SP in crafting engaging and emotionally charged shopping experiences. This is particularly relevant for e-commerce marketing strategies targeting the technologically adept Generation Z segment, which values immersive and authentic shopping experiences. As a result, this study strengthens the understanding of social presence theory while offering practical recommendations for developing impactful marketing strategies in live-streaming e-commerce.

The insights derived from this study provide several actionable implications for e-commerce professionals. Firstly, enhancing the SP of streamers in live streaming e-commerce is essential. Training streamers to engage interactively and deliver personalized information can boost perceived usefulness and evoke positive emotions, especially among Generation Z in Indonesia. Second, fostering interaction among users and other viewers during live-streaming sessions is vital.

While it does not significantly impact positive emotions, the presence of other viewers contributes to an enhanced perception of the platform's usefulness. Therefore, features such as live chat or user collaboration can be optimized to enrich the shopping experience. Third, displaying products engagingly and interactively in live streaming is essential to increase the perception of usefulness and positive emotions, ultimately encouraging impulse buying behavior. Informative product presentations and attractive visuals can create an immersive and enjoyable consumer shopping experience. Finally, marketers should devise holistic strategies that integrate both emotional and cognitive aspects of the shopping experience. By effectively managing impulsive urges through a solid SP, businesses can enhance the impact of their digital marketing strategies and build stronger customer loyalty among the tech-savvy and dynamic Generation Z.

Although this study has important implications for e-commerce practitioners, some recognized limitations are the basis for further research advice. Firstly, this research is limited to a specific geographical and demographic context, focusing exclusively on Generation Z in Indonesia. Consequently, the results need more applicability and generalizability to different demographic groups or geographical areas. Future research should expand geographic and demographic coverage by incorporating varied age groups and regions, enabling a more comprehensive understanding of how SP affects live-streaming e-commerce. Secondly, this research's reliance on self-reported data may introduce social desirability bias, potentially affecting data accuracy. Therefore, subsequent studies may use a mixed method combining surveys with observations or experiments to obtain more prosperous and accurate data. Thirdly, this study focuses solely on three aspects of SP in live streaming e-commerce, excluding critical factors such as content quality, streamer credibility, and technological features. To provide more comprehensive insights, further research is recommended to explore factors influencing impulse purchases, such as content quality, platform interactivity, and augmented reality technology. Finally, this research does not account for product type as a moderating factor, which may influence the relationship between SP and impulsive buying behavior. Different products may have different appeals to consumers, which can affect the intensity and nature of social interactions and impulsive purchasing decisions. Further research should include product type as a moderation variable in the research model. Examining how products with different levels of engagement (such as fashion products versus electronic products) affect SP and impulse buying behavior can provide more in-depth and specific insights.

References:

- [1]. Worldometers. (2024). *Top 20 largest countries by population*. Worldometers. Retrieved from: <https://www.worldometers.info/world-population/> [accessed: 10 May 2024].
- [2]. Kemp, S. (2024). *Digital 2024: Indonesia*. Datareportal. Retrieved from: https://datareportal.com.translate.google.com/reports/digital-2024-indonesia?x_tr_sl=en&x_tr_tl=id&x_tr_hl=id&x_tr_pto=tc [accessed: 12 May 2024].
- [3]. Febriyantoro, M. T., et al. (2024). The role of perception of digital celebrities on live stream shopping intention through social interaction in Indonesia. *Cogent Business & Management*, 11(1), 2336637. Doi: 10.1080/23311975.2024.2336637
- [4]. Slepian, R. C., et al. (2023). Social media, wearables, telemedicine and digital health—A Gen Y and Z perspective. *Oxford*, 524–544. Elsevier. Doi: 10.1016/B978-0-12-824010-6.00072-1
- [5]. Arizal, N., et al. (2024). Gen Z Customer Loyalty in Online Shopping: An Integrated Model of Trust, Website Design, and Security. *Journal of Internet Commerce*, 23(2), 121-143. Doi: 10.1080/15332861.2024.2330812
- [6]. APJII. (2024). *APJII jumlah pengguna internet Indonesia tembus 221 juta orang*. APJII. Retrieved from: <https://apjii.or.id/berita/d/apjii-jumlah-pengguna-internet-indonesia-tembus-221-juta-orang> [accessed: 13 May 2024].
- [7]. Annur, C. M. (2023). *Proporsi jumlah transaksi e-commerce berdasarkan kelompok usia*. Databoks.Katadata.co.id. Retrieved from: <https://databoks.katadata.co.id/datapublish/2023/06/2/transaksi-e-commerce-konsumen-usia-tua-terus-meningkat-ketimbang-gen-z-dan-milenial> [accessed: 14 May 2024].
- [8]. Gulfranz, M. B., et al. (2022). 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*, 68, 103000. Doi: 10.1016/j.jretconser.2022.103000
- [9]. Lina, Y., Hou, D., & Ali, S. (2022). Impact of online convenience on generation Z online impulsive buying behavior: The moderating role of social media celebrity. *Frontiers in psychology*, 13, 951249. Doi: 10.3389/fpsyg.2022.951249
- [10]. Warganegara, D. L., & Babolian Hendijani, R. (2022). Factors that drive actual purchasing of groceries through e-commerce platforms during COVID-19 in Indonesia. *Sustainability*, 14(6), 3235. Doi: 10.3390/su14063235
- [11]. BPS RI. (2020). *Hasil survei sosial demografi dampak COVID-19*. BPS RI. Retrieved from: <https://www.bps.go.id/id/publication/2020/06/01/669cb2e8646787e52dd171c4/hasil-survei-sosial-demografi-dampak-covid-19-2020.html> [accessed: 15 May 2024].
- [12]. Uzunoglu, C. (2024). *eCommerce in Indonesia: Market to reach US\$100 billion soon*. eCommerceDB. Retrieved from: <https://ecommercedb.com/insights/ecommerce-in-indonesia-consumer-trends-revenue-penetration-rate-livestream-shopping/4573> [accessed: 16 May 2024].
- [13]. Annur, C. M. (2022). *E-commerce terpopuler di kalangan anak muda, siapa juaranya?* Databoks.Katadata.co.id. Retrieved from: <https://databoks.katadata.co.id/datapublish/2022/06/28/e-commerce-terpopuler-di-kalangan-anak-muda-siapa-juaranya> [accessed: 17 May 2024].
- [14]. Rasmussen, G., & van Leeuwen, T. (2022). The human touch—Analyzing online and offline shopping. *Discourse & Communication*, 16(2), 149-159. Doi: 10.1177/17504813211043600
- [15]. Molinillo, S., Anaya-Sánchez, R., & Liébana-Cabanillas, F. (2020). Analyzing the effect of social support and community factors on customer engagement and its impact on loyalty behaviors toward social commerce websites. *Computers in Human Behavior*, 108, 105980. Doi: 10.1016/j.chb.2019.04.004
- [16]. Xia, Y. X., Chae, S. W., & Xiang, Y. C. (2024). How social and media cues induce live streaming impulse buying? SOR model perspective. *Frontiers in Psychology*, 15, 1379992. Doi: 10.3389/fpsyg.2024.1379992
- [17]. Chandra, S., et al. (2022). Personalization in personalized marketing: Trends and ways forward. *Psychology & Marketing*, 39(8), 1529-1562. Doi: 10.1002/mar.21670
- [18]. Yang, F., et al. (2021). Consumer perceived value and impulse buying behavior on mobile commerce: The moderating effect of social influence. *Journal of Retailing and Consumer Services*, 63, 102683. Doi: 10.1016/j.jretconser.2021.102683
- [19]. Wang, Y., et al. (2022). How live streaming changes shopping decisions in E-commerce: A study of live streaming commerce. *Computer Supported Cooperative Work (CSCW)*, 31(4), 701-729. Doi: 10.1007/s10606-022-09439-2
- [20]. Al Khaldy, M., et al. (2023). Redefining E-Commerce experience: An exploration of augmented and virtual reality technologies. *International Journal on Semantic Web and Information Systems (IJSWIS)*, 19(1), 1-24. Doi: 10.4018/IJSWIS.334123
- [21]. Liu, F., et al. (2022). Marketing by live streaming: How to interact with consumers to increase their purchase intentions. *Frontiers in Psychology*, 13, 933633. Doi: 10.3389/fpsyg.2022.933633
- [22]. Liu, F., et al. (2022). Marketing by live streaming: How to interact with consumers to increase their purchase intentions. *Frontiers in Psychology*, 13, 933633. Doi: 10.3389/fpsyg.2022.933633
- [23]. Li, N., Xuan, C., & Chen, R. (2024). Different roles of two kinds of digital coexistence: The impact of social presence on consumers' purchase intention in the live streaming shopping context. *Journal of Retailing and Consumer Services*, 80, 103890. Doi: 10.1016/j.jretconser.2024.103890

- [24]. Hu, M., & Chaudhry, S. S. (2020). Enhancing consumer engagement in e-commerce live streaming via relational bonds. *Internet Research*, 30(3), 1019-1041. Doi: 10.1108/INTR-03-2019-0082
- [25]. Ming, J., et al. (2021). How social presence influences impulse buying behavior in live streaming commerce? The role of SOR theory. *International Journal of Web Information Systems*, 17(4), 300–320. Doi: 10.1108/IJWIS-02-2021-0012
- [26]. Zhang, Y., Zhang, T., & Yan, X. (2024). Understanding impulse buying in short video live E-commerce: The perspective of consumer vulnerability and product type. *Journal of Retailing and Consumer Services*, 79, 103853. Doi: 10.1016/j.jretconser.2024.103853
- [27]. Guo, C., Yang, Z., & Zhao, S. (2023). The Impact of Interactivity on Live E-commerce Platform on The Intention of Generation Z's Consumption Behavior. *Lecture Notes in Education Psychology and Public Media*, 3, 256-266. Doi: 10.54254/2753-7048/3/2022548
- [28]. Kesharwani, A. (2020). Do (how) digital natives adopt a new technology differently than digital immigrants? A longitudinal study. *Information & management*, 57(2), 103170. Doi: 10.1016/j.im.2019.103170
- [29]. Chen, J., & Liao, J. (2022). Antecedents of viewers' live streaming watching: a perspective of social presence theory. *Frontiers in Psychology*, 13, 839629. Doi: 10.3389/fpsyg.2022.839629
- [30]. Zhang, M., & Shi, G. (2022). Consumers' impulsive buying behavior in online shopping based on the influence of social presence. *Computational Intelligence and Neuroscience*, 2022(1), 6794729. Doi: 10.1155/2022/6794729
- [31]. Liu, Z., Yang, J., & Ling, L. (2020). Exploring the influence of live streaming in mobile commerce on adoption intention from a social presence perspective. *Research Anthology on E-Commerce Adoption, Models, and Applications for Modern Business*. Doi: 10.4018/IJMHCI.2020040104
- [32]. Li, M., Wang, Q., & Cao, Y. (2022). Understanding consumer online impulse buying in live streaming e-commerce: A stimulus-organism-response framework. *International journal of environmental research and public health*, 19(7), 4378. Doi: 10.3390/ijerph19074378
- [33]. Ye, S., et al. (2020). Social presence, telepresence and customers' intention to purchase online peer-to-peer accommodation: A mediating model. *Journal of Hospitality and Tourism Management*, 42, 119-129. Doi: 10.1016/j.jhtm.2019.11.008
- [34]. Zhang, X., Cheng, X., & Huang, X. (2023). "Oh, My God, Buy It!" Investigating impulse buying behavior in live streaming commerce. *International Journal of Human-Computer Interaction*, 39(12), 2436-2449. Doi: 10.1080/10447318.2022.2076773
- [35]. Baytar, F., Chung, T., & Shin, E. (2020). Evaluating garments in augmented reality when shopping online. *Journal of Fashion Marketing and Management: An International Journal*, 24(4), 667–683. Doi: 10.1108/JFMM-05-2018-0077
- [36]. Lee, Y. Y., Gan, C. L., & Liew, T. W. (2023). Rationality and impulse buying: Is your emotion a part of the equation? *Computers in Human Behavior Reports*, 12, 100337. Doi: 10.1016/j.chbr.2023.100337
- [37]. Iyer, G. R., Blut, M., Xiao, S. H., & Grewal, D. (2020). Impulse buying: a meta-analytic review. *Journal of the academy of marketing science*, 48, 384-404. Doi: 10.1007/s11747-019-00670-w
- [38]. Chan, T. K., Cheung, C. M., & Lee, Z. W. (2017). The state of online impulse-buying research: A literature analysis. *Information & Management*, 54(2), 204-217. Doi: 10.1016/j.im.2016.06.001
- [39]. Short, J., Williams, E. and Christie, B. (1976) *The Social Psychology of Telecommunications*. John Wiley and Sons Ltd., Hoboken.
- [40]. Weidlich, J., Göksün, D. O., & Kreijns, K. (2023). Extending social presence theory: social presence divergence and interaction integration in online distance learning. *Journal of Computing in Higher Education*, 35(3), 391-412. Doi: 10.1007/s12528-022-09325-2
- [41]. Yeboah, A., Agyekum, O., Owusu-Prempeh, V., & Prempeh, K. B. (2023). Using social presence theory to predict online consumer engagement in the emerging markets. *Future Business Journal*, 9(1), 69. Doi: 10.1186/s43093-023-00250-z
- [42]. McDaniel, B. (2021). Popular music reaction videos: Reactivity, creator labor, and the performance of listening online. *New Media & Society*, 23(6), 1624-1641. Doi: 10.1177/1461444820918549
- [43]. Lin, J. H. T., et al. (2019). Setting the digital stage: Defining game streaming as an entertainment experience. *Entertainment Computing*, 31, 100309. Doi: 10.1016/j.entcom.2019.100309
- [44]. Wang, L., Zhang, R. S., & Zhang, C. X. (2024). Live streaming E-commerce platform characteristics: Influencing consumer value co-creation and co-destruction behavior. *Acta psychologica*, 243, 104163. Doi: 10.1016/j.actpsy.2024.104163
- [45]. Qing, C., & Jin, S. (2022). What drives consumer purchasing intention in live streaming e-commerce?. *Frontiers in Psychology*, 13, 938726. Doi: 10.3389/fpsyg.2022.938726
- [46]. Lu, B., & Chen, Z. (2021). Live streaming commerce and consumers' purchase intention: An uncertainty reduction perspective. *Information & Management*, 58(7), 103509. Doi: 10.1016/j.im.2021.103509
- [47]. Xu, X., Wu, J. H., & Li, Q. (2020). What drives consumer shopping behavior in live streaming commerce?. *Journal of electronic commerce research*, 21(3), 144-167.
- [48]. Sun, Y., et al. (2019). How live streaming influences purchase intentions in social commerce: An IT affordance perspective. *Electronic commerce research and applications*, 37, 100886.
- [49]. Li, M., Wang, Q., & Cao, Y. (2022) Understanding consumer online impulse buying in live streaming e-commerce: A stimulus-organism-response framework. *International journal of environmental research and public health*, 19(7), 4378. Doi: 10.3390/ijerph19074378

- [50]. Shang, Q., Ma, H., Wang, C., & Gao, L. (2023). Effects of background fitting of e-commerce live streaming on consumers' purchase intentions: a cognitive-affective perspective. *Psychology Research and Behavior Management*, 149-168. Doi: 10.2147/PRBM.S393492
- [51]. Dong, X., Zhao, H., & Li, T. (2022). The role of live-streaming e-commerce on consumers' purchasing intention regarding green agricultural products. *Sustainability*, 14(7), 4374. Doi: 10.3390/su14074374
- [52]. Stern, H. (1962). The significance of impulse buying today. *Journal of marketing*, 26(2), 59-62.
- [53]. Sohn, Y. S., & Ko, M. T. (2021). The impact of planned vs. unplanned purchases on subsequent purchase decision making in sequential buying situations. *Journal of Retailing and Consumer Services*, 59, 102419. Doi: 10.1016/j.jretconser.2020.102419
- [54]. Rodrigues, R. I., Lopes, P., & Varela, M. (2021). Factors affecting impulse buying behavior of consumers. *Frontiers in Psychology*, 12, 697080. Doi: 10.3389/fpsyg.2021.697080
- [55]. Khadijah, A., & Pangaribuan, C. H. (2023). The Age of Indulgence: An Online Impulsive and Compulsive Buying Analysis. *2023 Eighth International Conference on Informatics and Computing (ICIC)*, 1-6. IEEE. Doi: 10.1109/ICIC60109.2023.10382051
- [56]. Amos, C., Holmes, G. R., & Keneson, W. C. (2014). A meta-analysis of consumer impulse buying. *Journal of Retailing and Consumer Services*, 21(2), 86-97. Doi: 10.1016/j.jretconser.2013.11.004
- [57]. Sofi, S. A., Mir, F. A., & Baba, M. M. (2020). Cognition and affect in consumer decision making: Conceptualization and validation of added constructs in modified instrument. *Future Business Journal*, 6, 1-20. Doi: 10.1186/s43093-020-00036-7
- [58]. Tavares, D. R., et al. (2021). An Ontological Approach of the Cognitive and Affective Product Experience. *Frontiers in Neuroergonomics*, 2, 602881. Doi: 10.3389/fnrgo.2021.602881
- [59]. Rónai, L., et al. (2024). Emotions under control? Better cognitive control is associated with reduced negative emotionality but increased negative emotional reactivity within individuals. *Behaviour Research and Therapy*, 173, 104462. Doi: 10.1016/j.brat.2023.104462
- [60]. Lee, Y. Y., Gan, C. L., & Liew, T. W. (2023). Rationality and impulse buying: Is your emotion a part of the equation?. *Computers in Human Behavior Reports*, 12, 100337. Doi: 10.1016/j.chbr.2023.100337
- [61]. Casado-Aranda, L. A., Sanchez-Fernandez, J., & Ibanez-Zapata, J. A. (2022). It is all about our impulsiveness—How consumer impulsiveness modulates neural evaluation of hedonic and utilitarian banners. *Journal of Retailing and Consumer Services*, 67, 102997. Doi: 10.1016/j.jretconser.2022.102997
- [62]. Li, Z., Zhao, X., & Ou, G. (2023). Understanding customer satisfaction in curated subscription services: Moderating roles of subscription time and information disclosure. *Information & Management*, 60(6), 103834. Doi: 10.1016/j.im.2023.103834
- [63]. Hayu, R., et al. (2020). The effect of website quality and government regulations on online impulse buying behavior. *Management Science Letters*, 10(5), 961-968. Doi: 10.5267/j.msl.2019.11.015
- [64]. Febrilia, I., & Warokka, A. (2021). Consumer traits and situational factors: Exploring the consumer's online impulse buying in the pandemic time. *Social Sciences & Humanities Open*, 4(1), 100182. Doi: 10.1016/j.ssaho.2021.100182
- [65]. Zhang, X., & Yu, X. (2020). The impact of perceived risk on consumers' cross-platform buying behavior. *Frontiers in psychology*, 11, 592246. Doi: 10.3389/fpsyg.2020.592246
- [66]. Pham, A. D., et al. (2023). How do live-stream channels shape impulse buying behaviour? Empirical research on Vietnamese youth. *Asia Pacific Business Review*, 1-26. Doi: 10.1080/13602381.2023.2265320
- [67]. Chen, J. V., et al. (2022). An experimental study of consumers' impulse buying behaviour in augmented reality mobile shopping apps. *Behaviour & Information Technology*, 41(15), 3360-3381. Doi: 10.1080/0144929X.2021.1987523
- [68]. Kathuria, A., & Bakshi, A. (2024). Influence of website quality on online impulse buying behaviour: a systematic review of literature. *Marketing Intelligence & Planning*. Doi: 10.1108/MIP-05-2023-0241
- [69]. Tariq, A., et al. (2020). Online impulse buying of organic food: Moderating role of social appeal and media richness. *Proceedings of the Thirteenth International Conference on Management Science and Engineering Management*, 2, 586-599. Springer International Publishing.
- [70]. Chetioui, Y., & El Bouzidi, L. (2023). An investigation of the nexus between online impulsive buying and cognitive dissonance among gen Z shoppers: are female shoppers different?. *Young Consumers*, 24(4), 406-426. Doi: 10.1108/YC-06-2022-1548
- [71]. Wu, Y., Xin, L., Li, D., Yu, J., & Guo, J. (2021). How does scarcity promotion lead to impulse purchase in the online market? A field experiment. *Information & Management*, 58(1), 103283. Doi: 10.1016/j.im.2020.103283
- [72]. Kreijns, K., Xu, K., & Weidlich, J. (2022). Social presence: Conceptualization and measurement. *Educational Psychology Review*, 34(1), 139-170. Doi: 10.1007/s10648-021-09623-8
- [73]. Srivastava, S. C., & Chandra, S. (2018). Social Presence in Virtual World Collaboration. *MIS quarterly*, 42(3), 779-A16. . Doi: 10.25300/MISQ/2018/11914
- [74]. Lu, B., Fan, W., & Zhou, M. (2016). Social presence, trust, and social commerce purchase intention: An empirical research. *Computers in human behavior*, 56, 225-237. Doi: 10.1016/j.chb.2015.11.057
- [75]. Song, J., Moon, H., & Kim, M. (2019). When do customers engage in brand pages? Effects of social presence. *International Journal of Contemporary Hospitality Management*, 31(9), 3627-3645. Doi: 10.1108/IJCHM-10-2018-0816

- [76]. Singh, J., Singh, L., & Matthees, B. (2022). Establishing social, cognitive, and teaching presence in online learning—A panacea in COVID-19 pandemic, post vaccine and post pandemic times. *Journal of Educational Technology Systems*, 51(1), 28-45. Doi: 10.1177/00472395221095169
- [77]. Algharabat, R. S., & Rana, N. P. (2021). Social commerce in emerging markets and its impact on online community engagement. *Information Systems Frontiers*, 23, 1499-1520. Doi: 10.1007/s10796-020-10041-4
- [78]. Peng, Y., Ding, J., & Zhang, Y. (2024). Combination of streamers' product description and viewers' comments: moderating effect of streamer-viewer relationship strength. *Marketing Intelligence & Planning*, 42(1), 190-210. Doi: 10.1108/MIP-05-2023-0214
- [79]. Liao, J., et al. (2023). Creating immersive and parasocial live shopping experience for viewers: the role of streamers' interactional communication style. *Journal of Research in Interactive Marketing*, 17(1), 140-155. Doi: 10.1108/JRIM-04-2021-0114
- [80]. You, Z., Wang, M., & Shamu, Y. (2023). The impact of network social presence on live streaming viewers' social support willingness: a moderated mediation model. *Humanities and Social Sciences Communications*, 10(1). Doi: 10.1057/s41599-023-01892-8
- [81]. Sun, H., Chen, J., & Fan, M. (2021). Effect of live chat on traffic-to-sales conversion: Evidence from an online marketplace. *Production and Operations Management*, 30(5), 1201-1219. Doi: 10.1111/poms.13320
- [82]. Gu, Y., Cheng, X., & Shen, J. (2023). Design shopping as an experience: Exploring the effect of the live-streaming shopping characteristics on consumers' participation intention and memorable experience. *Information & Management*, 60(5), 103810. Doi: 10.1016/j.im.2023.103810
- [83]. Vonkeman, C., Verhagen, T., & Van Dolen, W. (2017). Role of local presence in online impulse buying. *Information & management*, 54(8), 1038-1048. Doi: 10.1016/j.im.2017.02.008
- [84]. Zhang, M., et al. (2022). How to retain customers: Understanding the role of trust in live streaming commerce with a socio-technical perspective. *Computers in Human Behavior*, 127, 107052. Doi: 10.1016/j.chb.2021.107052
- [85]. Anisah, T. N., Najmudin, M., & Sardi, A. E. (2023). From Interaction to Transaction: Analyzing the Influence of Social Presence on Impulsive Purchasing in Live Streaming Commerce. *Jurnal Manajemen Teori dan Terapan*, 16(3). Doi: 10.20473/jmtt.v16i3.49490
- [86]. Liu, D., & Yu, J. (2024). Impact of perceived diagnosticity on live streams and consumer purchase intention: streamer type, product type, and brand awareness as moderators. *Information Technology and Management*, 25(3), 219-232. Doi: 10.1007/s10799-022-00375-7
- [87]. Meng, L., et al. (2022). Understanding interaction rituals: The impact of interaction ritual chains of the live broadcast on people's wellbeing. *Frontiers in Psychology*, 13, 1041059. Doi: 10.3389/fpsyg.2022.1041059
- [88]. Goel, P., et al. (2024). Impact of sensory perceptions on the urge to buy impulsively. *Journal of Computer Information Systems*, 64(4), 469-485. Doi: 10.1080/08874417.2023.2224748
- [89]. Lee, C. H., & Chen, C. W. (2021). Impulse buying behaviors in live streaming commerce based on the stimulus-organism-response framework. *Information*, 12(6), 241. Doi: 10.3390/info12060241
- [90]. Xu, H., et al. (2020). A dual systems model of online impulse buying. *Industrial Management & Data Systems*, 120(5), 845-861. Doi: 10.1108/IMDS-04-2019-0214
- [91]. Lee, C. H., & Chen, C. W. (2021). Impulse buying behaviors in live streaming commerce based on the stimulus-organism-response framework. *Information*, 12(6), 241. Doi: 10.3390/info12060241
- [92]. Máynez Guaderrama, A., & Cavazos-Arroyo, J. (2022). Antecedents of Online Impulse Buying: An Analysis of Gender and Centennials' and Millennials' Perspectives. *Instituto de Ingeniería y Tecnología*. Doi: 10.3390/jtaer17010007
- [93]. Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern methods for business research/Lawrence Erlbaum Associates*.
- [94]. Henseler, J., et al. (2014). Common beliefs and reality about PLS: Comments on Rönkkö and Evermann (2013). *Organizational Research Methods*, 17(2), 182–209.
- [95]. Hair, J. F., et al. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). Sage Publications, Inc.
- [96]. Hair, J. F., et al. (2019). When to use and how to report the results of PLS-SEM. *European business review*, 31(1), 2-24. Doi: 10.1108/EBR-11-2018-0203
- [97]. Nunnally, J. C. (1975). Psychometric theory—25 years ago and now. *Educational Researcher*, 4(10), 7-21. Doi: 10.3102/0013189X004010007
- [98]. Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of applied psychology*, 88(5), 879. Doi: 10.1037/0021-9010.88.5.879
- [99]. Hair, J. F., et al. (2019). When to use and how to report the results of PLS-SEM. *European business review*, 31(1), 2-24. Doi: 10.1108/EBR-11-2018-0203
- [100]. Henseler, J. (2017). Bridging design and behavioral research with variance-based structural equation modeling. *Journal of advertising*, 46(1), 178-192. Doi: 10.1080/00913367.2017.1281780

- [101]. Chin, W., et al. (2020). Demystifying the role of causal-predictive modeling using partial least squares structural equation modeling in information systems research. *Industrial Management & Data Systems*, 120(12), 2161-2209.
Doi: 10.1108/IMDS-10-2019-0529
- [102]. Hair Jr, J. F., et al. (2021). Evaluation of formative measurement models. *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R: A Workbook*, 91-113. Doi: 10.1007/978-3-030-80519-7_5
- [103]. Chong, H. X., et al. (2023). The future of e-commerce? Understanding livestreaming commerce continuance usage. *International Journal of Retail & Distribution Management*, 51(1), 1-20.
Doi: 10.1108/IJRDM-01-2022-0007
- [104]. Fu, J. R., & Hsu, C. W. (2023). Live-streaming shopping: the impacts of para-social interaction and local presence on impulse buying through shopping value. *Industrial Management & Data Systems*, 123(7), 1861-1886.
Doi: 10.1108/IMDS-03-2022-0171
- [105]. Feng, Z., Al Mamun, A., Masukujjaman, M., Wu, M., & Yang, Q. (2024). Impulse buying behavior during livestreaming: Moderating effects of scarcity persuasion and price perception. *Heliyon*, 10(7).
Doi: 10.1016/j.heliyon.2024.e28347
- [106]. Singh, P., Sharma, B. K., Arora, L., & Bhatt, V. (2023). Measuring social media impact on Impulse Buying Behavior. *Cogent Business & Management*, 10(3), 2262371.
Doi: 10.1080/23311975.2023.2262371