

ORIGINAL

## Assessing the Impact of Live-streaming Duration and Frequency on Customer Stickiness in E-Commerce Platforms

## Evaluación del Impacto de la Duración y Frecuencia de las Transmisiones en Vivo en la Fidelidad del Cliente en Plataformas de Comercio Electrónico

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### ABSTRACT

**Introduction:** this study investigates the impact of live-streaming duration and frequency on customer stickiness in Malaysian e-commerce platforms, emphasizing the mediating role of perceived value. With live streaming becoming a popular marketing tool, understanding its influence on customer engagement and loyalty is crucial for e-commerce businesses aiming to strengthen customer retention.

**Method:** a quantitative research approach was employed, utilizing a structured online survey distributed to Malaysian consumers who engaged in live-streaming shopping events on platforms like Shopee and Lazada. A total of 500 valid responses were collected for structural equation modeling (SEM) analysis.

**Results:** the findings reveal that live-streaming frequency has a stronger influence on perceived value and customer stickiness than its duration. Frequent live-streaming sessions enhance customer engagement, foster emotional connections, and increase perceived value, which in turn boosts loyalty and repeat purchases. Duration had a less significant impact on customer stickiness. Perceived value mediated the relationship between live-streaming frequency and customer stickiness.

**Conclusions:** this research highlights the importance of frequent, interactive live-streaming sessions for increasing customer loyalty in e-commerce. Perceived value plays a central role in converting frequent interactions into long-term engagement. E-commerce platforms should focus on increasing live-streaming frequency and enhancing content interactivity to improve customer retention and foster sustained business growth. These insights offer practical guidance for e-commerce operators seeking to optimize their live-streaming strategies.

**Keywords:** Live-streaming Duration; Live-streaming Frequency; Perceived Value; Customer Stickiness; Malaysia.

### RESUMEN

**Introducción:** este estudio investiga el impacto de la duración y frecuencia de las transmisiones en vivo sobre la fidelidad del cliente en plataformas de comercio electrónico de Malasia, destacando el papel mediador del valor percibido. Dado que las transmisiones en vivo se han convertido en una herramienta de marketing popular, entender su influencia en el compromiso y lealtad del cliente es crucial para las empresas de comercio electrónico que buscan fortalecer la retención de clientes.

**Método:** se empleó un enfoque de investigación cuantitativa, utilizando una encuesta estructurada en línea distribuida a consumidores malayos que participaron en eventos de compras a través de transmisiones en vivo en plataformas como Shopee y Lazada. Se recogieron 500 respuestas válidas para el análisis de modelos de ecuaciones estructurales (SEM).

**Resultados:** los resultados revelan que la frecuencia de las transmisiones en vivo tiene una influencia más fuerte sobre el valor percibido y la fidelidad del cliente que su duración. Las sesiones frecuentes de transmisiones en vivo mejoran el compromiso del cliente, fomentan conexiones emocionales e incrementan el valor percibido, lo que a su vez potencia la lealtad y las compras repetidas. La duración tuvo un impacto menos significativo en la fidelidad del cliente. El valor percibido mediaba la relación entre la frecuencia de las transmisiones en vivo y la fidelidad del cliente.

**Conclusiones:** esta investigación resalta la importancia de las transmisiones en vivo frecuentes e interactivas para aumentar la lealtad del cliente en el comercio electrónico. El valor percibido juega un papel central en convertir las interacciones frecuentes en un compromiso a largo plazo. Las plataformas de comercio electrónico deberían centrarse en aumentar la frecuencia de las transmisiones en vivo y mejorar la interactividad del contenido para mejorar la retención de clientes y fomentar un crecimiento empresarial sostenido. Estos hallazgos ofrecen orientación práctica para los operadores de comercio electrónico que buscan optimizar sus estrategias de transmisiones en vivo.

**Palabras clave:** Duración de las Transmisiones en Vivo; Frecuencia de las Transmisiones en Vivo; Valor Percibido; Fidelidad del Cliente; Malasia.

## INTRODUCTION

The e-commerce landscape, especially in Malaysia has changed dramatically over the years; live-streaming is one of those new shopping channels that have started to gain prominence. E-commerce businesses often see customer stickiness as a function of 2 dimensions live-streaming duration and frequency. Customer stickiness, a measure of the repeat engagement of consumers, is especially resilient when supported by an inherent perceived value in imbibing these interactive shopping experiences. Recent studies also found a significant association between social media marketing efforts and brand loyalty, highlighting the importance of live content in delivering better shopping interface through human to human interaction.<sup>(1)</sup> This is especially important in the e-commerce industry because, due to the accelerated digital adoption behavior witnessed during and post-COVID-19<sup>(2)</sup> it has become imperative for businesses to unpack how live streaming elements would influence customer bonding to gain a competitive edge in this dynamic market. This study seeks to systematically evaluate these interactions and contribute towards a deeper comprehension of consumer behavior in the online retail sphere of Malaysia.

One of the most critical players in dynamic markets such as Malaysia, live streaming commerce has transformed the general look of e-commerce entirely. This innovative approach combines the best of both worlds by linking up digital technology with a social aspect in order to help consumers interact more closely with products. Furthermore, research findings have shown that the level of interaction in live streaming has a significant positive effect on consumer emotional arousal and impulsive purchase intentions.<sup>(3)</sup> Both aspects of the contemporary consumer experience shopping and social engagement have been demonstrated to create community, encouraging repeat patronage.<sup>(4)</sup> Second, the intermediary function of live streaming is prominent, as inter-personal traits and advocacy with audiences can moderate the effects of e-commerce strategies. High levels of interactivity and authenticity in a positive live stream environment also correlate with greater consumer engagement, which paving the way for increased purchasing behaviors. Consequently, the interlocking nature of these factors impacts both present buying choices and future customer loyalty<sup>(5)</sup> which speaks to an imperative in commercial platforms to implement alternative tactics such as live streaming for online sales channels.

The sudden emergence of live-streaming commerce, especially in Malaysia, has sharply underscored key pain points that e-commerce platforms must overcome in order to maintain consumer engagement and experience. However, as this new shopping mode takes the lead in popularity among livestreaming types, lack of research focus on live-streaming practices to customer stickiness (live streaming frequency and live streaming duration) has opened a knowledge gap that needs to be filled. While this viewpoint is echoed in much of the current literature, many published works still lack information regarding product specific consumer surfing behaviors and hedonics to help understand intent to purchase.<sup>(6)</sup> In addition, ongoing live transactions have brought related issues of security and trust, drawing attention in a range of studies on the topic of online shopping during the pandemic.<sup>(7)</sup> The gap points to demand on research to breakdown the different dimensions in live streaming that can change perceived value and in turn affects customer behavior, particularly when authenticity and personalization are expected to be high.<sup>(8,9)</sup> Given the increasing demands on e-commerce live streaming, e-business operating systems will not only have to develop a variety of innovative live streaming programs, but also need to be in a timely manner, actively resolve problems related to product quality authenticity

and service integrity reputation and customer experience bonding, and further enhance consumer loyalty.<sup>(10)</sup> Therefore, this study aims to fill in the research gap by exploring those drivers which make consumers sticky in live e-commerce livestreaming.

While the extant literature on live-streaming e-commerce reveals a number of important research gaps, there is little to explain how exactly customers become sticky on this highly evolving battlefield. Since a number of previous studies have also pointed out that streamer characters and user engagement affect the popularity.<sup>(11)</sup> However, as far as we know whitepapers, existing research does not provide a balanced view of how live-streaming duration and frequency relate to customer loyalty. Research on streamers credibility and viewers' emotional engagement during live streaming has been intuitively focused but mostly in segregated elements rather than a comprehensive examination of how these dimensions are interwoven to manifest customer behavior.<sup>(12)</sup> In addition, although some studies adopt the model, such as the Stimulus-Organism-Response (SOR) theory of customer behavior to evaluate consumer responses, the empirical evidence on how these models are applied to live streaming customer stickiness has not been thoroughly researched.<sup>(13)</sup> It seems clear that features such interactivity and engaging with a larger community play into social components of value, yet how they directly correlate with value perception / stickiness remain less understood.<sup>(14)</sup> To bridge the gap, this study conducts a comprehensive investigation of how live-streaming elements interact with customer behaviors, which are essential for platform operator strive to increase user retention as competition heats up.<sup>(15,16)</sup>

Building on live-streaming and intra-industry literature, this study aims to explore their relationship with consumer stickiness in Malaysian e-commerce platforms by considering its mediating role of perceived value. Through a systematic analysis of how different components that are associated with live streaming, such as the length and frequency of webcasts affect customer engagement outcomes on the one hand and loyalty intentions on the other, this study has attempted to provide insights that can help e-commerce practitioners in informing strategies. The study is designed to contribute to the literature and aims at examining what the functions of live-streaming will impact consumer behaviors, given the growing need for integrated social interaction in shopping experiences. In providing valuable insights into how these exchanges operate, this research also advances knowledge of customer retention within a live streaming setting and reinforces the recognition that perceived value can lead to more meaningful interactions in ways that foster enduring consumer loyalty in an increasingly dynamic digital environment. Ultimately, results are anticipated to help platform operators iterate their live-streaming strategies to be more in line with consumer's expectations and preferences leading to higher customer stickiness and long-term business success.

Its academic contribution and practical contribution for the relatively new area of live-streaming e-commerce make the research meaningful. In doing so, the results of this study fill an important gap in prior research overlooking live-streaming duration and frequency together with customer stickiness. The results could give e-commerce players and those in the connected space some actionable ideas to achieving greater consumer loyalties and engagements, especially in context of a fast-evolving digital shopping behaviors taking place within the Malaysian market. In addition, given that we identified perceived value as a mediator, this information can inform how platforms can provide value added customer experience interactions, further strengthening long-term loyalty. More important, this contribution proves vital for businesses as they revise their strategies to accommodate new consumer behaviors and expectations.<sup>(17,18)</sup> Hence, the findings of this study can provide guidance for developing effective marketing strategies and operational procedures for e-commerce platforms in order to stay competitive and meet the demands of modern consumers, which is a requisite in today's age of digital economy.<sup>(19,20)</sup>

## Literature review

### *E-Commerce Platforms in Malaysia overview*

Among the digital revolution and changing consumer behaviors, e-commerce platforms in Malaysia have also evolved. The market is competitive, including both local and international players, with Shopee and Lazada standing out above others.<sup>(21,22)</sup> In addition, government initiatives such as the Digital Free Trade Zone (DFTZ) are also shaping the Malaysian e-commerce landscape to gear up small and medium enterprises (SMEs) for cross-border trade both locally and abroad. However, this growth is held back by many factors such as data privacy concerns and trust issues among consumers preferring the traditional shopping aiding human behinds them resulting in sub-optimal uptake of online shopping platforms.<sup>(21)</sup> As highlighted in the contemporary literature, digital marketing strategies have revolutionized the way organizations interact with customers and manage their satisfaction.<sup>(23,24)</sup> The COVID-19 pandemic has significantly sped up the transition of buying things online, leading companies to quickly jump on digital marketing developments that enhance consumer confidence and retention.<sup>(23,25)</sup> Incumbent competition legislation and policies, may also influence the piecemeal evolution or development of e-commerce in Malaysia as it addresses the processes of competition with demands for e-commerce consumer rights protection hence its impact on the 'natural' organic growth of e-commerce.<sup>(26)</sup>

Given the growing rate of digitalization among industries, perceptions influencing consumer purchase intentions are increasingly important for supporting continued e-commerce growth in Malaysia. Further studies are also encouraged to investigate the embedding of technology, consumer behavior and market regulation for a robust, consumer-centric e-commerce ecosystem.<sup>(26)</sup>

#### *Live-streaming Duration*

In e-commerce, the length of time for live streaming events plays a major role in consumer engagement and purchasing behavior. One study found that longer live-streaming periods led to more engagement and emotional attachment between the hosts and audience can contribute to impulse purchase behavior.<sup>(27)</sup> This suggests that the finding of a positive relationship between long durations and more loyal users is universal: prolonged engagement builds trust and friendship, which is crucial when it comes to developing para-social relationships between streamers and viewers.<sup>(28)</sup> In addition, the influence of live streaming in helping retail sales may have been enhanced through its interactive nature, where shoppers can ask questions and get immediate product information live as well as interact with sellers without the need to physically visit stores or shops.<sup>(29)</sup> Zoom contains interactive elements like polls and live Q&A, which also help to sustain viewer engagement and longer watch times.<sup>(30)</sup> For e-commerce platforms, it is essential to understand how long their live broadcasts should last in order to increase their sales potential but also maintain customer satisfaction. Live streaming is capable of providing real-time product demonstrations which are an effective way to facilitate what consumer behavior literature describes as extensive engagement, a type of engagement with products that engages consumers for extended periods and this may influence consumer purchasing intentions.<sup>(11)</sup> While the results indicate that the ideal lengths of time for high satisfaction and conversions do exist, it remains clear that there is more than enough need for growth in refining marketing strategies in live commerce as times quickly change.

#### *Live-streaming Frequency*

However, the frequency of live broadcasts hugely influences how and whether consumers will engage with content or make a purchase on e-commerce platforms. More frequent live streaming has been illustrated by research as one way to improve user engagement, creating habitual and real-time touchpoints, while growing viewership familiarity and consumer trust in the streamers.<sup>(31)</sup> The increased interaction sees more impulsive purchase likely to be because of e-sports fans high inner motivation, and the amount of viewing live streams may facilitate such behavior.<sup>(32)</sup> Carrying out regular live streaming strategic promoting can help promote a sense of urgency and has physiological exclusivity value in inducing consumer's live event participation when the latter is being encouraged to participate time-oriented promotions.<sup>(31)</sup> The above process can activate continuous audience interest and enable them to watch again, thereby improving the overall shopping experience of live streaming platforms.<sup>(33)</sup> Not able to be overstated enough in the face of rigorous competition in the digital marketplace, maintaining well-structured engagement helps retain consumer interaction over time, leading directly to increased sales.<sup>(28)</sup> Furthermore, it is important to investigate how streamer properties may influence viewer retention and conversion as different dynamics could prompt consumers to become more habitual live-streaming users.<sup>(32,34)</sup>

#### **Perceived Value**

What they are willing to pay determine if your livestream items can be sold in live-streaming e-commerce. It consists of the evaluation of the benefits in relation to the costs paid for, that impact purchase intentions and customer loyalty. Research has demonstrated that consumers are much more likely to shop after a live-streaming session when they feel high functional and emotional values from this shopping experience, which finds supports directly from the extant literature. This is particularly important in the live-streaming format, where more interactive content captures attention and subsequently prompts viewer engagement; this affects the viewer's perception of a viewing experience. In addition, the perceived value of veritable contents is positively related to consumer trust in online shopping because personal relationships between consumers and streamers may be unreliable. Live-streaming can also lower perceived risk by providing real-time product demonstration and interaction with live streamers, facilitating consumers to gain a higher level of pre-purchase information, resources and services that leads them to have more trust in signal information and attempt to enhance their perceived value. In this research, we found that perceived value can not only improve the consumer's immediate purchase behavior but also further motivates repeated engagement with the platform over time. This understanding holds great consequences for e-commerce platforms looking to disrupt their marketing stratagems. Fan et al.<sup>(35)</sup> suggests opening by describing to the audience what value is perceived, with engaging builds up messages which will be coordinated with trustworthy personalities, coupled with reasons why that great amount of news substance can more easily engage and then hold in their members within a competitively streamed environment. Consequently, we elaborate that perceived value remains a salient yet multidimensional construct to study the ways in which it shapes consumer attitudes and behaviors in this rapidly changing area of live-streaming commerce.



### *Customer Stickiness*

In live-streaming e-commerce platforms, customer stickiness is a key concept in the interpretation of consumer behavior. This reflects customers tend to use a platform regularly that is based on the behavior influenced by psychological and experiential effects. Thus, the research has shown that customer stickiness is affected by perceived value, in other words the higher the benefit consumers think they get from a platform, they will tend to return.<sup>(36)</sup> While the quality of live streams significantly determines purchase behavior, engaging and relevant content during a live stream helps create an emotional brand bond and increase repeat use. Also, another interesting angle is the concept of flow any understanding this facet should be key to figuring out customer stickiness. Flow occurs when users are deeply involved with an experience that then leads to longer interaction times and continuous usage. On the one hand, live streaming features allow live streamers to interact with viewers more freely, which increases their perceived value and creates a sense of community among viewers, and on the other hand this will increase user stickiness.<sup>(37)</sup> This interplay between these factors further accentuates the need to grasp psychological connection and user satisfaction as basics for stickiness strategies on e-commerce platforms. Stickiness is achieved through a blend of user experience, social connectivity and perceived value that collectively create an immersive environment for consumers to be absorbed in. Given the importance of these dynamics to e-commerce platforms striving to maintain a customer base and edge out the competition, gaining a comprehensive identification of how they operate is vital.

### **Hypothesis Development**

#### *Live-streaming Duration and Perceived Value*

The duration of live streaming with perceived value, and potential consumer behavior changes in e-commerce. Research shows that live streams of longer duration lead to higher perceived value because they allow the viewers more time to be engaged with a product which leads to a better understanding of what is being presented. Longer durations, more opportunities for interactive content allow a more complete understanding of product quality, which is crucial to conversion and purchase choice. Additionally, due to interactive live streaming fostering a higher emotional connection between the viewers and the broadcast, this results in stronger perceived value. Consumers are expected to have longer interactions with a product, so their feelings may span beyond the more functional aspects to the emotional or social dimensions that are associated with photographically mediated experiences. Live streaming features (responsiveness and interaction driven) played a much more prominent role in perceived value, as well. It can make duration a more significant part of perceived value, and even act as separate prices to add on top. Therefore, live stream duration should positively influence consumer perceived value which in turn enhances purchase intentions and satisfaction.

#### *Live-streaming Frequency and Perceived Value*

Live-streaming sessions have a very high frequency of effects on perceived value, in the area of e-commerce to consumers. A higher rate of frequency will lead to a better engagement and interaction which in turn enhances the consumer perceptions value obtained from the content being offered.<sup>(38)</sup> Live-streaming platforms, in many cases with scheduled sessions, thereby ensure a steady supply of new and updated information for viewers and provide further evidence that frequent interaction can lead to greater customer satisfaction.<sup>(39)</sup> Studies show a direct relationship between the level of engagement and the intensity emotionally involved with the brand, which have a vital effect on perceived value. When consumers start to expect new content frequently, their degree of engagement usually rises as well, creating a sense of community for loyalty and bettering consumer experience. In addition, the real-time communication property in subsequent live streaming provides convenience for consumers to express their questions as well as obtain immediate responses leading to increase the value perception of shopping experience.

#### *Live-streaming Duration and Customer Stickiness*

The connection between live-streaming time and customer stickiness is critical to e-commerce platforms that strive to promote long-term user interaction.<sup>(40,41)</sup> More recent research has shown that longer live streams result in higher viewer retention, as the consumers experience more immersive and emotionally engaging experiences. People who stay for longer streams are more likely to get attached to the content and brand, leading to stronger loyalties. This also fits into the concept that longer time spent can amplify perceived value, consumers are exposed to more detailed understandings of the product and instant feedback while using it.<sup>(42)</sup> Moreover, regular interactions with lengthy live streaming goes a long way in keeping the consumer engaged. The interactive element enables user questions to be answered and allows for clarifications, which adds even more value to the notion of shopping.

### *Live-streaming Frequency and Customer Stickiness*

The more frequently customers participate in live-streaming sessions, the stickier they become to e-commerce platforms. More opportunities facilitate increased interaction leading to higher user engagement and retention, a significant positive relationship between online stickiness and repurchase intention where Streamers/Hosts trust also impacts loyalty from their regular viewers through interactions.<sup>(43)</sup> The impact of e-commerce live-streaming marketing activities as well how to improve it can affect user experience and play an important role in evaluation and loyalty towards the platform.<sup>(44)</sup> Studies have shown that people who are continuously exposed to live streams feel a sense of sociality and trust which is connected with Long term loyalty towards the platform.<sup>(45)</sup> Frequent live streaming events should make their content more interactive and immediate the effects of different interaction styles on customer engagement. Consumers may become involved further, ultimately increasing emotional attachment to the brand. Consumers gradually generate habits through their constant interaction with regular content and increase understanding of purchasing behaviors from live-streaming experiences, thus leading to stickiness of consumer behavior.<sup>(46)</sup>

### *Perceived Value and Customer Stickiness*

A strong perceived value can lead to consumer stickiness, as the relationship between these two will determine customer loyalty in live-streaming e-commerce.<sup>(47)</sup> The most important role of brand that shapes customers attitude toward a brand is the value perceived. High perceived value makes the customer feel more satisfied, and causes the customer to be more engaged and use platform interaction repeatedly, which is conducive to enhancing customer stickiness. Some research has proved that when consumers perceive the value conveyed by their purchases (such as product and service quality, emotional bonding with products or shopping behavior), their intention of loyalty to live-streaming platform will be heightened.<sup>(48)</sup>

In addition to fueling initial sales, perceived value also works to strengthen customer connections and feed into an ongoing cycle of repeat engagement.<sup>(49)</sup> This is especially important in the highly contested context of live-streaming, as consumers have many alternatives. Thus, the best way for retailers to increase stickiness is perhaps by improving perceived value that can be done through quality content and interactive experiences which in-turn fosters greater generation of customer satisfactions; satisfied loyalty customers are also likely to recommend the platform to others and come back for future purchases. Therefore, it is assumed that live streaming commerce perceived value will lead to higher customer stickiness and long-term engagement.<sup>(50)</sup>

### **Theoretical Framework in Live-Streaming E-Commerce**

Two foundational theories underpin the study of live-streaming e-commerce, specifically focusing on customer stickiness within this unique retail environment: the Uses and Gratifications (U&G) Theory and the Flow Theory.

#### *Uses and Gratifications Theory (U&G)*

This view assumes that media users select media and the kinds of messages delivered in them so as to satisfy their certain individual needs (Gratifications). In live-streaming e-commerce, the customers may interact with the content to fulfill their needs of entertainment, social interaction and information seeking.<sup>(51)</sup> This realization is confirmed by research, which has indicated that offering personalized and engaging information can increase satisfaction levels and boost the probability of continuous engagement. The streaming can create an interactive and unique experience for viewers, engaging them in valuable ways to increase perceived value that is related to customer stickiness.<sup>(52)</sup>

#### *Flow Theory*

Flow Theory explicates a holistic experience of being deeply absorbed in an activity, experienced as optimal intrigue and pleasure. In livestreaming environments, flow can occur through a continuous interaction with live content allowing viewers to become more deeply involved and satisfied.<sup>(53)</sup> This intensive experience is strongly associated with many behavioristic behaviors such as the fiber pattern of re-entering on this market. Research further places the highlight on empirically sourced evidence to determine that engaging and interactive experiences not only make working pleasant but also boost long-term loyalty through strengthening platform stickiness.<sup>(54)</sup> Taken together, these theories provide an understanding of the forces driving customer experiences in live-streaming e-commerce and demonstrates to a significant degree how perceived value drives customer stickiness, long-term engagement.<sup>(55)</sup>

## Conceptual Framework

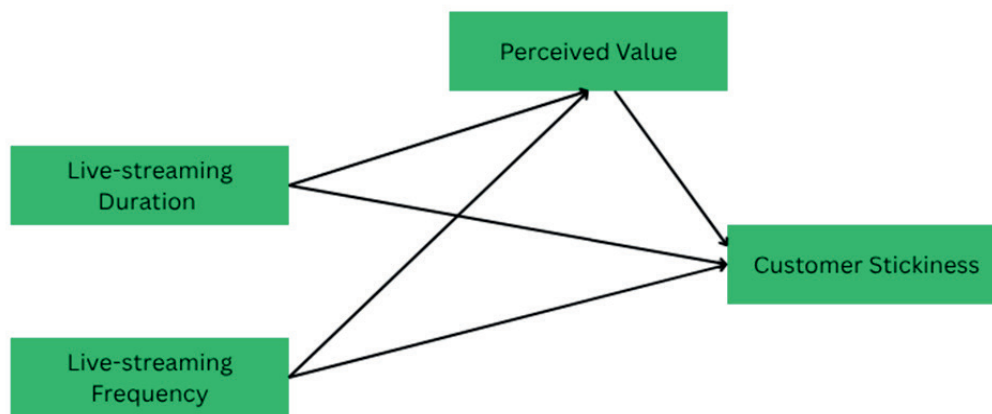


Figure 1. Conceptual Framework

## METHOD

### Sampling and Data Collection

This investigation adopted a positivist paradigm and followed a deductive reasoning strategy to examine the relationships among the duration and frequency of live-streaming, perceived value, and customer stickiness in the context of Malaysia's e-commerce platforms. This study applied a quantitative research framework. Data for this research was gathered using a structured questionnaire administered to Malaysians who actively participated in live-streaming shopping events on e-commerce platforms like Shopee and Lazada. The study sample comprised Malaysia-based consumers who engaged in live-streaming shopping within the prior six months. The study was conducted on e-commerce platforms due to the growing use of live-streaming as a marketing tool to examine user behavior in this phenomenon. The consumers from Malaysia are of particular interest in this study because of the rapid growth in the use of e-commerce in the country and the high level of adoption of shopping technologies and social commerce.

In the absence of a defined sampling frame for users of e-commerce live streaming, a non-probability convenience sampling method was adopted to enlist participants. An online survey was shared through social media, e-commerce forums, and community groups that catered to users of live-streaming commerce. The survey aimed to capture participants' engagement metrics including live-streaming frequency and duration, value perception, and their level of customer stickiness (loyalty, and propensity for repeat purchases). To estimate the required sample size for the study, a power analysis was conducted using G\*Power 3.1.9.4 software. The analysis indicated that a minimum of 150 responses would be sufficient to attain 95 % statistical power with a 5 % significance level. In order to achieve that minimum response rate, a total of 600 questionnaires were administered through both online and offline channels. This strategy yielded an 83 % response rate which resulted in a total of 500 valid responses. This sample size is deemed adequate for the structural equation modelling analysis, providing reliable and significant outcomes.

Table 1. Construct reliability and validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
CS	0,844	0,863	0,895	0,681
LSD	0,852	0,856	0,900	0,692
LSF	0,914	0,920	0,936	0,745
PV	0,883	0,886	0,915	0,682

The measurement model reliability and validity capped the criteria benchmarks across all constructs. Customer Stickiness (CS) displayed notable internal consistency with a Cronbach's alpha of 0,844, composite reliability (0,863; 0,895) and an AVE of 0,681 which surpassed the criteria threshold of 0,50 for convergent validity. In the same vein, Live-streaming Duration (LSD) and Live-streaming Frequency (LSF) also displayed strong internal reliability with Cronbach's alpha of 0,852 and 0,914, respectively, along with AVE values exceeding 0,69. Perceived Value (PV) displayed strong reliability as well ( $\alpha = 0,883$ , AVE = 0,682). These outcomes affirm that all constructs fulfil prerequisite benchmarks for reliability and convergent validity in PLS-SEM analysis.

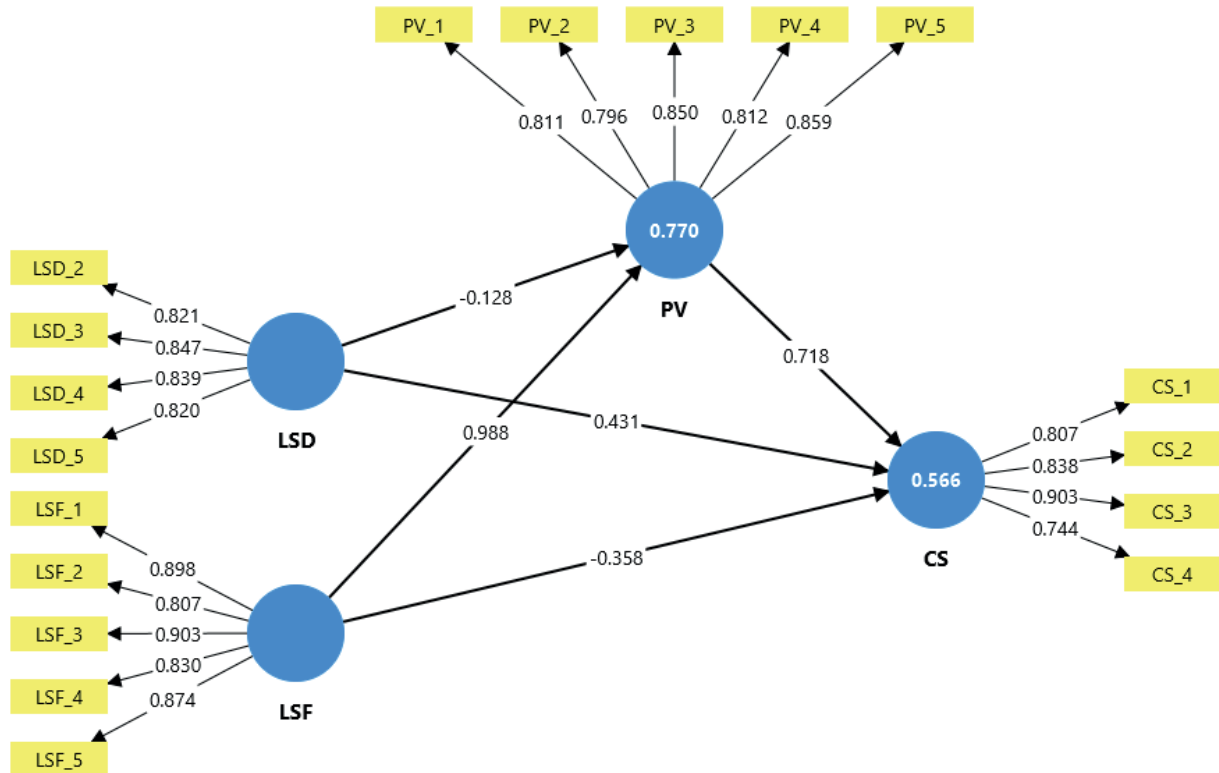


Figure 2. SEM

Table 2. Discriminant validity				
	CS	LSD	LSF	PV
CS	0,825			
LSD	0,766			
LSF	0,721	0,991		
PV	0,809	0,839	0,966	

Discriminant validity was evaluated using the heterotrait-monotrait correlation (HTMT) ratio. All HTMT values were below both the conservative cut-off of 0,85 and the more lenient 0,90 threshold, which confirms satisfactory discriminant validity. Specifically, the HTMT values were 0,721 for CS and LSF and 0,991 for LSD and LSF. Although the HTMT between Live-streaming Duration and Live-streaming Frequency 0,991 did approach the upper limit, it was still acceptable given the 0,90 threshold which is frequently employed in social science research. Overall, the outcomes support that each construct is empirically distinct from the others.

Table 3. Fornell-Larcker criterion				
	CS	LSD	LSF	PV
CS	0,825			
LSD	0,647	0,832		
LSF	0,649	0,877	0,863	
PV	0,723	0,738	0,875	0,826

Using the Fornell-Larcker criterion, we further assessed discriminant validity. As demonstrated in table 3, the square roots of the AVEs (shown as diagonal values) were greater than the respective inter-constructs correlations (off-diagonal values) confirming the criterion set by Fornell and Larcker. For example, the square root of the AVE for Customer Stickiness, 0,825, surpassed the correlations with Live-streaming Duration 0,647, Live-streaming Frequency 0,649, and Perceived Value 0,723. All constructs exhibited similar patterns, thereby confirming the measurement model's discriminant validity.



Table 4. Model fit		
	Saturated model	Estimated model
SRMR	0,098	0,098
d_ULS	1,632	1,632
d_G	1,612	1,612
Chi-square	1605,746	1605,746
NFI	0,627	0,627

The model fit was evaluated with a number of goodness-of-fit indices. For both saturated and estimated models, the standardized root mean square residual (SRMR) was 0,098. This number, while exceeding the common threshold of 0,08, is still below 0,10 which is considered a PLS-SEM model fit. The chi-square was 1605,746 and the normed fit index (NFI) was 0,627. This is below the threshold of 0,90, but is common for PLS-SEM models in which complexity is somewhat disregarded. Also supporting the model's fit were the discrepancy measures dULS=1,632 and dG=1,612.

Table 5. R-square		
	R-square	R-square adjusted
CS	0,566	0,560
PV	0,770	0,768

The determination coefficient (R<sup>2</sup>) of the predictive model was assessed with the help of the structural model. Customer Stickiness (CS) attained an R<sup>2</sup> of 0,566 (adjusted R<sup>2</sup>=0,560), showing that slightly more than half of the variance was explained by the predictor variables. Perceived value (PV) displayed even greater explanatory value with R<sup>2</sup>=0,770 (adjusted R<sup>2</sup>=0,768), showing that 77 % of its variance was captured by the model. These metrics, categorized them as moderate to substantial explanatory power in PLS-SEM.

Table 6. f-square				
	CS	LSD	LSF	PV
CS				
LSD	0,097			0,017
LSF	0,034			0,980
PV	0,273			

The effect sizes (f<sup>2</sup>) were determined to assess the impact of each exogenous construct on the endogenous variables. As noted, effect sizes f<sup>2</sup> 0,02, 0,15, and 0,35 were categorized as small, medium, and large. Live-streaming Duration (LSD) had a small impact on Customer Stickiness (f<sup>2</sup>=0,097) and had no impact on Perceived Value (f<sup>2</sup>=0,017). On the other hand, Live-streaming Frequency (LSF) had a small impact on Customer Stickiness (f<sup>2</sup>=0,034) but a very large impact on Perceived Value (f<sup>2</sup>=0,980), indicating that LSF fundamentally determined the perceived value. Furthermore, Perceived Value (PV) moderated Customer Stickiness (f<sup>2</sup>=0,273f), thus affirming its mediating impact in the model.

Table 7. Total effects					
	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ( O/STDEV )	P values
LSD -> CS	0,339	0,338	0,178	1,906	0,057
LSD -> PV	-0,128	-0,119	0,102	1,263	0,207
LSF -> CS	0,352	0,356	0,183	1,924	0,054
LSF -> PV	0,988	0,980	0,084	11,736	0,000
PV -> CS	0,718	0,707	0,134	5,372	0,000

The comprehensive impacts of the structural model are shown in table 7. Live-streaming Duration (LSD) had a positive but weakly significant total effect on Customer Stickiness (CS) ( $\beta=0,339$ ,  $t=1,906$ ,  $p=0,057$ ). This suggests a limited impact of LSD on CS at the 5 % significance threshold. In addition, LSD had no significant effect on Perceived Value (PV) ( $\beta=-0,128$ ,  $t=1,263$ ,  $p=0,207$ ). Live-streaming Frequency (LSF) had a clearer impact on customer perceptions. LSF had a positive total effect on CS ( $\beta=0,352$ ,  $t=1,924$ ,  $p=0,054$ ) which was near significance, and a very strong and significant effect on PV ( $\beta=0,988$ ,  $t=11,736$ ,  $p<0,001$ ). Subsequently, PV had a highly significant strong total effect on CS ( $\beta=0,718$ ,  $t=5,372$ ,  $p<0,000$ ) thereby affirming its mediating role within the structural model as previously documented. The overall findings indicate both live-streaming duration and live-streaming frequency positively influence customer stickiness; however, frequency operates primarily through the enhancement of perceived value, which serves as the dominant factor for customer stickiness within the e-commerce environment.

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ( O/STDEV )	P values
LSD -> PV -> CS	-0,092	-0,088	0,077	1,194	0,232
LSF -> PV -> CS	0,709	0,696	0,160	4,446	0,000

This mediation analysis aimed to evaluate individual indirect impacts that live-streaming activities have on Customer Stickiness (CS) via Perceived Value (PV). As illustrated in table 8, the indirect effect of Live-streaming Duration (LSD) on CS via PV was both negative and non-significant ( $\beta=-0,092$ ,  $t=1,194$ ,  $p=0,232$ ). This result indicates that in this model, PV does not mediate the effect of LSD on CS. On the other hand, Live-streaming Frequency (LSF) had a pronounced and significant indirect effect on CS through PV ( $\beta=0,709$ ,  $t=4,446$ ,  $p<0,000$ ). This suggests that PV strongly mediates the effect of LSF on customer loyalty actions. As highlighted in the literature on mediation analysis within the PLS-SEM context, significant indirect paths substantiate the mediation effect, regardless of the direct effect being weak or marginally significant.

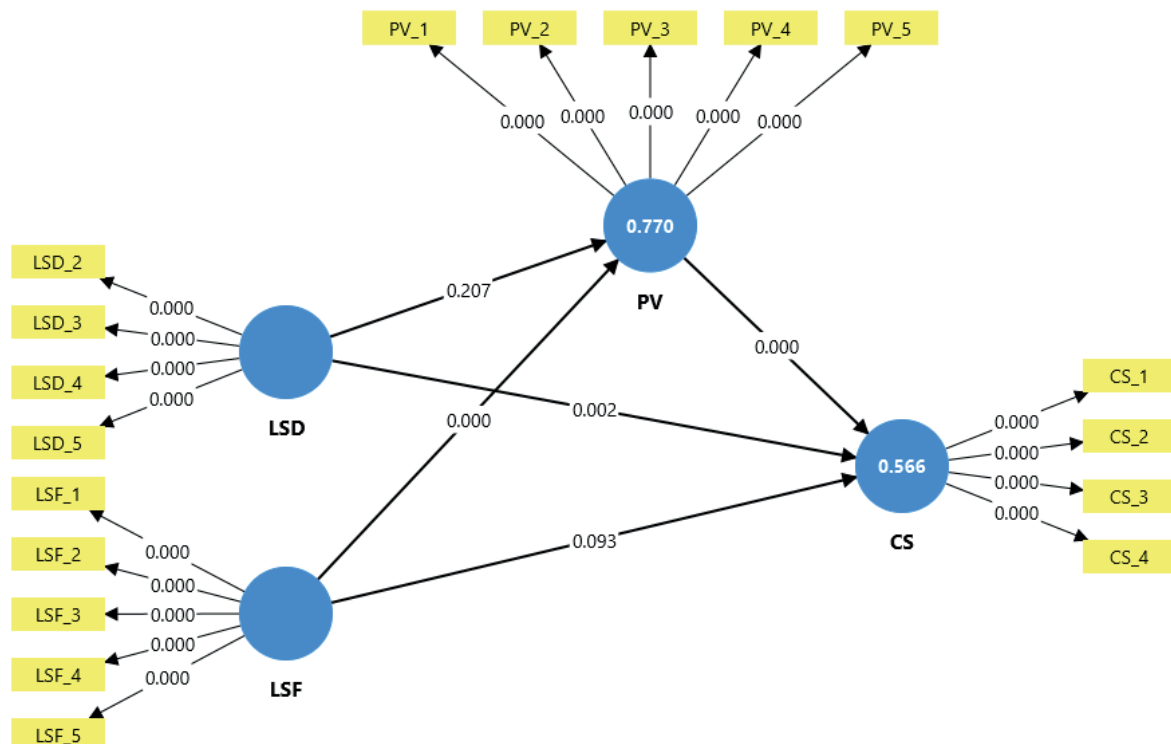


Figure 3. R2

## DISCUSSION

This study examined the associations among the duration and frequency of live streaming, perceived value, and customer stickiness in relation to the Malaysian e-commerce landscape. The findings of this study illuminate the dynamics of consumer behavior and their loyalty to the platform. The frequency of live

streaming proved to be one of the strongest drivers of perceived value and customer stickiness. As the findings suggest, frequent live-streaming sessions seem to be helpful in enhancing value perception because of the interaction and engagement offered to the customers. This is in line with previous research which emphasized the importance of active content provision and engagement for consumer loyalty to the platform.<sup>(56)</sup> The positive impact of live streaming on perceived value is in line with the Uses and Gratifications Theory, which argues that customers seek engagement that meets their social and information needs. Live-streaming duration has a weaker effect on customer stickiness when compared to the impact of the live-streaming frequency. The impact on value perception and stickiness was not as notable as expected, even though longer live-streaming durations fostered greater engagement. Comprehensive product demonstrations during extended live-streams do not automatically enhance customer loyalty, which is determined by the interaction level and engagement value of the content provided. This supports, which concluded that the emotional connection developed during live-streaming events is influenced by the content and the host's engagement with the audience.<sup>(57)</sup>

The perceived value of live-streaming as a mediating factor between the frequency of live-streams and customer stickiness highlights the relevance of perception in live-streaming e-commerce business models. Customers with a positive perception of value attached to interaction tend to exhibit high loyalty to the business, as purchasing and return visits to the platform become customary. This supports the Flow Theory, which asserts that optimal customer satisfaction is achieved when a high level of engrossing interactivity in a frictionless environment is offered, and customer loyalty and retention are bolstered.<sup>(58)</sup> As a possible example for future exploration, value perception did not mediate the effect of live-streaming duration on customer stickiness, indicating the need for deeper exploration. This lack of a strong mediating effect valued between the live-streaming duration and customer stickiness could be due to content fatigue, exemplified by disengagement that occurs due to overexposure. Long streams, especially when excessively extended in duration, may lead to disengagement as attention wanes, a phenomenon documented in diverse user engagement and content consumption studies.

The contributions of this study are both practical and theoretical. The practical contributions include acknowledging and addressing the gaps in literature regarding consumer engagement to live streaming using content streaming as a source of consumer engagement and customer loyalty. The incorporation of perceived value as a mediating variable also explains why e-commerce platforms that adopt a live-streaming marketing technique could be perceived as enhancing customer relationship value, thereby increasing relationship marketing in customer retention. Based on the findings, e-commerce platforms should focus on increasing the number of live-streaming sessions as a means of fostering consumer loyalty. Since the amount of time spent on interaction has a minimal effect on value perception, platforms should strive to optimize interactivity as well as customization of content during live streams to enhance customer engagement. Moreover, e-commerce managers should ensure that live-streams cater to the targeted consumer preferences by balancing the frequency of live-streams with content quality to prevent customer attrition while promoting retention over time.<sup>(59)</sup> This research has identified live-streaming frequency as the predominant factor that enhances consumer stickiness in the Malaysian e-commerce ecosystem. With the changing dynamics of the Malaysian ecosystem, e-commerce platforms should not only focus on value creation but also revamp their live-streaming frameworks to enrich interactivity to drive consumer value and deepen engagement to promote sustained consumer interaction and foster long-term growth. Future studies could look into the impact of content quality and the use of various interactive components on customer loyalty in live-streaming e-commerce.

### Main Findings

The significant conclusions from the research indicate that the frequency of live-streaming sessions impacts the value perceived by the customer as well as customer loyalty in Malaysian e-commerce platforms. Live-streaming sessions that are conducted more frequently are viewed as having a greater value which subsequently aids in improving customer engagement and loyalty. This is in consonance with earlier studies which have shown that participation in live-streaming sessions that are conducted frequently builds trust and a sense of community among the customers which enhances customer retention. The perceived value gap is bridged by the meaningful interaction and engagement that customers derive from the shopping experience. The strong perceived value gap bridges customer stickiness which increases loyalty. In contrast, the longer the live-streaming sessions are, the weaker the impact customer stickiness will have. This means that live-streaming for a long period of time will not guarantee enhanced engagement or loyalty from customers. It is well known that live streaming as a form of engagement contributes to emotional attachment. While emotional engagement is crucial for customers, the overall impact of the duration of time on perceived value and "stickiness" was surprisingly low. This shows that customers will not sit through live streams that are more than a certain length if those streams are not sufficiently entertaining or interactive. The mediating role of perceived value between elements of live-streaming and customer stickiness was validated based on its impact on consumer loyalty. Customers' loyalty was reinforced by strong perceived value from interactive, frequent live-streams,

reinforcing the notion that perceived value is a significant factor of customer stickiness in live-streaming e-commerce. This research broadens the understanding of live-streaming commerce and deepens appreciation for e-commerce strategies focusing on mastering customer loyalty.

### **Theoretical and Practical Contributions**

This study offers both theoretical and practical contributions to the growing body of research on live-streaming e-commerce and customer behavior.

#### *Theoretical Contributions*

The integration of live-streaming frequency and duration with customer stickiness, mediated by perceived value, constitutes the principal theoretical contribution of this research. This study seeks to fill the gap regarding the impact of live-streaming duration and frequency of engagement with embedded consumer loyalty. By looking into the value mediation impact, this study seeks to extend the Uses and Gratification Theory (U&G) showing that streamed contents are not limited to entertainment and information but rather valued interactive and tailored sessions. This study also broadens the application of Flow Theory by demonstrating that the immersive and emotionally engaging experience provided by frequent and prolonged participation in live-streaming platforms fosters deep emotional attachment, which in turn enhances customer stickiness. Along with live-streaming duration and customer stickiness, this study also contributes to the literature in which the frequency of live-streaming emerged as a more dominant influencer of customer stickiness in comparison to live-streaming duration suggesting a need for a new approach in content strategy within e-commerce. This research goes further in the direction of e-commerce marketing live-streaming increasingly becoming perceived as a device for nurturing ties with target customers as opposed to a temporary gimmick.

#### *Practical Contributions*

Practically speaking, the findings offer practical strategies for operators of e-commerce platforms, particularly those utilizing live-streaming as a core marketing feature. The study highlights the need to increase the frequency of live-streaming events instead of the duration of each session. Emphasis should be placed on utilizing interactive live-streaming sessions on e-commerce platforms, as they enable brands to maintain continuous engagement with consumers, cultivating a community and brand loyalty. Additionally, the study emphasizes the need to develop live-streaming experiences with high-quality content, tailored communication, and captivating product displays to meet customer expectations. This includes high-quality content, tailored communication, and captivating product displays. The study highlighted platforms that increase focus towards customer engagement and the subsequent emotional attachment via live-streaming will gain greater customer loyalty and retention. In the context of the highly competitive market of e-commerce in Malaysia, the in-depths of the research reveal the need for the adjustment of strategies to embrace live-streaming to meet changing consumer expectations and preferences. Businesses can increase customer value and satisfaction by maintaining high levels of customer engagement and interactivity through live-streaming, thereby ensuring enduring engagement in a digitalized market. This research makes a notable contribution in connecting live-streaming activities with customer stickiness. It provides theoretical rationales to inform subsequent work while also offering practical guidance to e-commerce platforms seeking to leverage live-streaming as a tool for customer retention and loyalty.

### **Limitations and Future Research**

Although this research meaningfully sheds light on the impact of live-streaming duration and frequency, perceived value, and customer stickiness within the Malaysian e-commerce setting, some limitations have emerged that need to be addressed in future research.

#### *Limitations*

The Malaysian market's focus in this study poses a significant limitation, as it may not extend to other areas with differing consumer behavior's, rates of technology adoption, and cultural frameworks. Other nations with e-commerce platforms may function under certain circumstances that would impact the ways in which live-streaming shapes customer engagement and loyalty. Therefore, further research investigating the applicability of the findings in other regions, including those with developed or developing e-commerce markets, would be beneficial. While this study analyzed the durations and frequencies of live-streaming, it did not capture the varying qualitative and interactive components that may affect consumer attitudes and behaviors. Elements such as the creativity of the content, the charisma of the host, or the type of goods marketed (high-end versus staple items) may moderate the impact of live-streaming on customer retention. Additional research on these issues would enhance the understanding of the influence of content and its presentation on consumer engagement and loyalty. The reliance on perceived value as a mediating variable, while important, exemplifies another limitation as it ethnocentrically simplifies the customer's behavioral complexity in live-streaming e-commerce. Perceived customer stickiness may also result from other crucial psychological factors, including but not limited to emotional

engagement, trust, or social influence. Additional trust or social presence as mediators could be added to enhance the model for customer loyalty in live-streaming e-commerce.

#### *Future Research*

Considering the constraints of this study, several potential research gaps can be addressed. First, there is an opportunity to focus on other branch markets of the e-commerce industry, especially in areas with distinctive consumer markets and technological adoption to evaluate the generalizability of the findings. Such studies could analyse the differences in consumer behavior in different areas and study culturally based reasons for the success or lack of customer retention through the use of live-streams. Additional research can focus on the interactive and content quality dimensions of live-streaming events. Studying the impact of content type, whether entertaining or informative, and the host's attributes, including expertise, charisma, or trustworthiness, on perceived value and customer loyalty, would deepen the understanding of live-streaming as a marketing tool. It would also be interesting to study the impact of product categories on customer engagement as responses to luxury items may differ from those to everyday products. However, a more in-depth investigation would study the changing impact of live-streaming over time. As e-commerce companies perfect their use of live-streaming, analyzing long-term shifts in customer behavior, loyalty, and engagement would deepen understanding of the impact live-streaming has on customer stickiness. Additional research could assess other psychological factors, such as emotional connection, trust, or social influence, that drive customer stickiness to formulate a more comprehensive model that explains customer loyalty in the context of live-streaming e-commerce. Considering these factors may illuminate the multifaceted dynamics involved and aid e-commerce platforms in devising more efficient customer retention strategies. This research has live-streaming integrated into e-commerce customer engagement as a focal point in the conversation, and as its contribution, the study has provided fresh perspectives to the existing body of knowledge; however, in the context of the e-commerce framework with live-streaming, there are still many dimensions that remain open for additional research.

#### **CONCLUSIONS**

This research offers a thorough analysis of the effect of live-streaming duration and frequency on consumer stickiness in e-commerce in Malaysia, focusing on the perceived value as a mediator. The research sheds light on the impact of the components of live-streaming on consumer behavior and loyalty towards the platform, thus augmenting the available literature on live-streaming commerce. The most significant conclusion of the research is that the frequency of live-streaming has a greater impact on customer engagement and value perception than the duration of live-streaming. Consistent and engaging live-streaming builds a sense of community and connects customers on a trust and emotional level, which results in loyalty and increased patronage. On the contrary, the duration of live-streaming, while contributing to engagement, did not significantly influence customer stickiness, which underscores the need for engagement to center on quality and interactivity rather than duration. Perceived value stands out as a critical mediator in the link between live-streaming frequency and customer stickiness. High value perceiving customers are more likely to repurchase and stay loyal to a live-streaming platform. This highlights the necessity of delivering value-based tailored interactions on live-streaming commerce for effective long-term retention of customers. However, the study fills a gap in the literature by illustrating the mediating impact of perceived value and enhances the mastery of live-streaming as a contemporary tool of customer engagement and loyalty. Moreover, it emphasizes the need for content quality, host cues, and other psychological dimensions of consumer behavior in the context of live-streaming consumer culture. Practically, the findings offer a valuable consulting opportunity for e-commerce platforms. Specifically, to boost customer stickiness and long-term loyalty, live-streaming needs to occur more frequently and content should be of high quality and interactive. E-commerce platforms can sharpen their live-streaming approaches using these findings to adopt more responsive and proactive strategies to consumer behavior in the intensely competitive digital market. This research underscores live-streaming as a powerful and critical customer loyalty driver in e-commerce, providing useful advice for platform providers on how to fine-tune their live-streaming strategies for better customer retention and sustained long-term business growth.

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#### **ETHICAL APPROVAL**

Ethical approval for this study was obtained from the Research Ethics Committee of the Monash Business School, Monash University Malaysia. All participants were provided with detailed information about the study's objectives, their right to confidentiality, and their right to withdraw from the study at any time without penalty. Informed consent was obtained from each participant prior to their inclusion in the research. This study was conducted in compliance with the ethical guidelines outlined in the 1964 Declaration of Helsinki and



its subsequent amendments.

#### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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#### **FINANCING**

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#### **CONFLICT OF INTEREST**

Authors declare that there is no conflict of interest.

#### **AUTHORSHIP CONTRIBUTION**

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*Data curation:* Jiang Qiyi.

*Formal analysis:* Jiang Qiyi.

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