Research article

Effects of interactivity affordance on user stickiness in livestream shopping : identification and gratification as mediators

Yingying Ma

Communication University of Zhejiang, China

ARTICLE INFO

ABSTRACT

In this day and age, livestream shopping is developing by leaps and bounds in China. It has been proved that livestream shopping is efficient in attracting customers and boosting the sales of products. However, very little research has been carried out on user stickiness, which plays a valuable role in business success. In light of the stimulus–organism–response framework (S–O–R), a multiple-mediation model (identification and gratification as mediators) was established to examine the effect of interactivity affordance (S) on the user stickiness (R) of a sample of 489 Chinese livestream viewers. Structural equation modeling with bootstrapping estimation was performed to examine the mediating roles of identification (O-cognitive) and gratification (O-affective). The modeling results revealed that the relationship between interactivity affordance and user stickiness was partially mediated by identification combined with utilitarian gratification and fully mediated by identification combined with hedonic gratification. The findings stress the importance of categorizing gratifications. In addition, these findings offer new perspectives for understanding the effects of IT affordance on user stickiness.

1. Introduction

As a subset of e-commerce, livestream shopping is developing by leaps and bounds in China [4,78,117,130]. Livestream shopping on social media enables real-time face-to-face interaction between streamers and viewers [13]. According to the literature, the success of livestream shopping can be attributed to its unique real-time interactivity [14,146], its customizability [117,146], streamers [17,39, 78,100,146], and its capacity for visualization [117]. With no doubt, livestream shopping has bloomed into a major form of shopping for many Chinese consumers. According to industrial reports [16,64], the size of Chinese livestream consumers has reached 384 million by the middle of 2021, and this number accounts for 38% of all Chinese Internet users. Although retailers are increasingly using livestream shopping to attract customers and increase sales volume [17], research in this domain remains scant. Research in the domain of livestream shopping comprises four strands. The first strand of research focuses on the antecedents of consumers' purchase and engagement intention [32,40,114]. For example, Guo et al. [40] found that swift guanxi and trust lead to customer engagement intention. Sun et al. [117] claimed that immersion and presence give rise to purchase intention in the livestream commerce context. The second strand of research concentrates on the factors that create satisfaction with and loyalty to livestream shopping among consumers [19,49,71,100]. For example, Huang et al. [46] found that streamers' certain characteristics (eg., charismatic leadership) give rise to viewer loyalty. Ma [100] claimed that consumers' perceived information, service and argument qualities are linked with their satisfaction towards livestream shopping. The third line of research puts emphasis on streamers' influence on consumer behavior

[80,81,100,125]. For instance, trustworthiness and expertise have been repeatedly proved as important streamer characteristics that can influence consumer's perceptions and behaviors [81,100]. The fourth stream of research is related to the technological features of livestream shopping and its effects on consumer behavior and trust [82,149]. For instance, Sun et al. [117] found that consumers' purchase intention is influenced by IT affordances. Chen et al. [15] claimed that live streaming features can mitigate consumers' uncertainty and enhance their purchase intention. To identify the gaps in the existing literature and further emphasize the significance of the current study, the authors summarized the existing livestreaming literatures in AppendixA.

As evidenced above, there is a paucity of research on consumer stickiness in the livestream shopping context. According to a recent industrial report [31], one of the major challenges the livestream practitioners facing is retaining the existing customers. For the practitioners, attracting customers is one thing and retaining them is another thing [146]. As an important measure of loyalty, stickiness refers to "the extent to which social commerce (s-commerce) platforms can acquire and retain customers" [57]. Customer retention is essential for business success as it costs 1/5 of the price of customer acquisition [113]. As far as the author knows, there are only two studies exploring the antecedents of customer stickiness in the livestream commerce context [4]. So as to gain a thorough understanding of customer stickiness and its antecedents in the livestream shopping context, the present study built a theoretical framework based on the stimulus–organism–response (S–O–R) model, IT affordances theory and social identity theory. Besides, although many scholars have indicated that interactivity affordance plays an important role in live-stream shopping, very few of them have "eliminated the noise" and specifically studied the role that interactivity affordance plays in influencing consumer behavior. For example, Lin et al. [86] included three livestream shopping affordances (interactivity, stickiness, word of mouth) as predictors of consumers' purchase intention. Their theoretical framework is comprehensive indeed. However, the inclusion of too many antecedents may make the results confusing in some ways. For example, the significance of a specific antecedent is still unclear. As mentioned before, interactivity affordance is the salient feature that deserves further investigation. Hereby, the current study deepens the understanding of interactivity affordance in livestream commerce by taking it as the only independent variable in the framework. Given the importance of customer stickiness in retailing, the practitioners may benefit from the current study and make customer retention strategies accordingly.

Scholars have proposed that the success of livestream commerce hinges on several factors, which are explained as follows. (1) The interactive features of social media platforms enable streamers to communicate with shoppers in real time, which enhances the streamer–shopper relationship and influences shoppers' purchase decisions [86,148]. (2) The multisensory aspects of live streaming help streamers to showcase their products in detail and address shoppers' concerns regarding streamers and their products [88,130]. (3) Being the core mediators of livestream commerce, live streamers are referred to as "grassroots influencers" and considered to be less driven by profits than other actors are [102]. Thus, shoppers are inclined to follow the sincere recommendations of streamers when making purchasing decisions [138]. Research has provided hard evidence to confirm that the above-mentioned features serve as the driving force for consumer attraction. However, it is still unknown whether the remarkable features give rise to consumer stickiness and how do they impact one another in the mechanism. "Stickiness" implies the extent to which social commerce (s-commerce) platforms can acquire and retain customers [57]. Hsu and Liao [58] stated that platforms exhibit high stickiness when consumers repeatedly come back and spend a long time on these platforms. Affordance theory posits that human behaviors are triggered by specific affordances or possibilities offered by an environment [44]. In the present study, the interactivity affordance of livestream platforms is hypothesized to result in user stickiness due to the interactive features of livestream commerce. In addition, based on the S–O-R framework, the present study intends to further elucidate the mechanisms through which interactivity affordance (S) affects user stickiness (R). In light of the S–O–R model, environmental stimuli(S) affect behavioral responses(R) through cognitive and affective states of organisms(O) [33,103]. Streamers are often seen as grassroots influencers who share similar social statuses and beliefs with their followers [52]. According to social identity theory, the sense of identification results from an individual's appraisal of their similarities with other individuals, groups, and organizations [79,106]. In streams, viewers may identify with streamers through the frequent interactions and information exchanges enabled by interactivity affordance [3]. When people perceive specific individuals to be similar to themselves , they tend to perceive the information conveyed by these individuals to be valuable and useful [35,36,51]. Furthermore, individuals find it more enjoyable to interact with people with similarities to themselves [2,11,35]. Hereby, the present study predicted that identification with streamers (O-cognitive) would lead to user utilitarian and hedonic gratification (O-affective) and subsequently to user stickiness with respect to livestream platforms. There are three main reasons for using the S–O–R model as an overarching theory in the current study. First, given that the S–O–R model has been extensively adopted in marketing research to explain consumer behavior [56,72,87,92,105,136,147,150], it is believed that the theory is appropriate for the present study. Additionally, there is an increasing number of studies that have started to apply the S–O–R framework in the livestream shopping context [97,98,137]. In other words, it has been repeatedly proven that the S–O–R paradigm is applicable for the livestream commerce context. Second, the S–O–R framework provides a comprehensive perspective, from which the scholars can thoroughly investigate the relationships between the environmental stimuli, affective and cognitive responses and behavior in livestream shopping. Third, the S–O–R framework provides a theoretical basis for simultaneously including cognitive and affective factors as organisms in the current study. Specifically, interactivity affordance was treated as environmental stimuli(S), identification with streamers (cognitive response) and gratifications (affective response) were simultaneously included as the organisms(O) and user stickiness was treated as the behavior response (R). Through the lens of S–O-R paradigm, the researchers can thoroughly explore the mechanisms through which technology features affect behavior. Given the essential role of interactivity affordance in influencing consumer behavior, the S–O–R framework enables the scholars to further investigate the mechanisms through which interactivity affordance affects user stickiness.

The rest of this paper proceeds as follows: Section 2 provides a review of the relevant literatures. Section 3 introduces the research methodology. Section 4 and Section 5 concentrate on data analysis and results presentation. Lastly, implications and limitations are presented in Section 6.

2. Literature review

2.1. S–O–R model

Stemming from environmental psychology, the stimulus–organism–response (S–O–R) paradigm states that environmental stimuli (S) affect individuals' behavioral responses (R) through their cognitive and affective internal states (O; [103]). Scholars have stressed the existence of multiple inner states in an organism due to the presence of a tiered perceptual spectrum [141]. Similarly, Berkowitz [10] and Holbrook and Batra [62] have suggested that exposure to stimulus influences individuals' cognitive processes and subsequently influences affective reactions. A wealth of research has used the S–O–R model to understand e-commerce consumer behaviors [147,150] such as customer engagement [47,70], customer loyalty [101], website stickiness [34], s-commerce intention [123,153], impulse buying [24,55,83,90,91,129] and compulsive buying [65]. Lately, the theory has been applied in the livestream shopping research. For instance, Ma et al. [97] used the S–O–R model to investigate consumers' purchase intentions in the livestream shopping context. Lee and Chen [81] and Ming et al. [98] explained the livestream shoppers' impulse buying behaviors from the viewpoint of S-O-R model. Likewise, Xue et al. [137] adopted the S–O–R model to explore the indicators of social commerce engagement. As the S–O–R model has been effectively and extensively applied in online consumer research, the model is assumed to be appropriate for the present study. Additionally, the S–O–R model is a comprehensive framework for studying the relationship between environmental stimuli and behavioral responses through internal states. Even though the theory highlights the existence of multiple inner states in an organism, the majority of the current studies include either cognitive or affective factors as internal states. Thus, the inclusion of both cognitive factor (identification) and affective factor (gratification) as organisms may shed light on the mechanism through which stimuli (interactivity affordance) affects response (user stickiness). The research findings may reveal how the inner states impact one another in the mechanism and provide a novel insight into the application of S–O-R model in the future.

2.2. Interactivity affordance as a stimulus

Drawing on the S–O–R model, stimuli (S) are environmental factors that are external relative to individuals and affect their internal states [103]. Chan et al. [23] identified two types of stimuli: external and internal stimuli. That is to say, technical features and beliefs regarding them can be external stimuli. Likewise, other scholars have indicated that perceptions of environmental attributes are stimuli that affect organisms and responses [153]. For instance, Liu et al. [92] used perceived similarity as an environmental stimulus to study consumers' purchase intention. Zhang et al. [153] treated perceptions of technological features (eg. perceived interactivity) as environmental stimuli and studied consumers' engagement intention in s-commerce. Yang and Zeng [144] took perceived interactivity and mobility as stimuli to illustrate social media continuance intention. Japutra et al. [67] used perceived challenge as an environmental stimulus to explain mobile commerce customer engagement behaviors.

In an online environment, technical features are key factors that may shape individuals' cognitive perceptions, emotions, and behaviors [153]. The users, in all likelihood, prefer s-commerce over other e-commerce formats because of its interactive attributes [53]. Through social media platforms, s-commerce provides the distinctive feature that is the affordance of interactivity [86], and according to affordance theory, affordance is associated with what the environment can provide to induce individuals to perform certain behaviors [1]. Likewise, the Affordances-Psychological Outcomes-Behavioral Outcomes framework posits that the affordances may impact the consumers' psychological states and further induce certain behaviors [135]. According to Norman [108], there are two kinds of affordances: real affordances and perceived affordances. Evidence abounds that both real and perceived affordances can serve as effective environmental stimuli and affect individuals' inner states. By the same token, Theory of Interactive Media Effects (TIME) suggests that affordances can influence user psychology [119]. For example, Yang and Gong [142] treated affordances as stimuli to explain the mobile gamers' behaviors. "Interactivity affordance" is focused on collaboration and interaction and is defined as users' perception of their active, reciprocal, and synchronous communication and interaction with others on social media platforms [95, 121]. In the livestream commerce area, scholars used interactivity affordance and perceived interactivity interchangeably [86]. Interactivity affordance comprises three dimensions, namely two-way communication, synchronicity, and active control [6]. Two-way communication measures how much viewers and live streamers can interact mutually through live streaming, and synchronicity describes users' perceived immediacy of communication with live streamers [126]. During live streaming sessions, live streamers and viewers are enabled to interact in real time [99]. Viewers are empowered to ask questions using chat boxes and live streamers can respond immediately [117]. According to media synchronicity theory, feedback immediacy is essential for developing a favorable understanding of information [28]. Active control refers to how much users can control the two-way communication between themselves and live streamers [126]. During live streaming sessions, live streamers answer questions and promote products according to their viewers' personal needs [117]. Therefore, viewers may perceive a sense of control in a live streaming context. Although the interactive features have been proved as part and parcel of e-commerce, their influence on livestream consumer stickiness is still unclear.

2.3. Identification and gratification as organisms

Organisms (O) are individuals' inner cognitive and affective states, which are triggered by environmental factors [103]. Cognitive reactions refer to mental processes whilst affective reactions refer to emotional responses [23]. Berkowitz [10] and Holbrook and Batra [62] have suggested that exposure to a stimulus first activates individuals' cognitive processes, which then lead to affective reactions. Yang et al. [141] proposed that an organism can be a tiered perceptual spectrum that comprises multiple inner states. Thus,

identification and gratification are simultaneously included in the present study and treated as cognitive and affective responses.

Identification is a key cognitive factor affecting an individual's behavior [29,84]. Hu et al. [54] suggested that livestream viewer's identification with streamers and audience groups lead to the development of continuous-watching intention. According to social identity theory, identification is an individual's appraisal of their similarities with other individuals, groups, and organizations [106]. In light of Maslow's hierarchy of needs theory, human beings require connectedness and belongingness. Culturally, people from collectivist cultures care more about group member similarities and social connectedness [61]. The current study is conducted in China, a typical collectivistic society, thus identification with the streamers is assumed to influence the consumers' inner reactions and behaviors. Ashforth and Mael [3] proposed that interpersonal and reciprocal interactions are an essential factor in developing identification. In the livestreaming context, streamers are grassroots influencers with similar social statuses and beliefs to their followers [22,52]. Therefore, through two-way, synchronic, and personalized interactions, viewers may perceive that they share similarities with streamers and develop a sense of identification with them. Thus, H1 is made as follows:

H1. Interactivity affordance has a positive influence on the users' identification with the streamers.

Gratification has been defined as "psychological satisfaction or affect related to and resulting from a cognitive appraisal" [120]. Originating from communication research, the uses and gratifications (U&G) theory asserts that individuals use a specific medium to fulfill their needs [77]. So far, many researchers have used the U&G theory to study consumer behaviors in a livestreaming context [20, 48,50,85,99]. For instance, Chen et al. [14] used the U&G theory to study consumers' purchase and gift-giving intentions in the livestream shopping context. Ma [99] discovered that livestream users' purchase intentions were influenced by their hedonic, utilitarian, and social gratification. From the utilitarian perspective, utilitarian gratification comprises practical and goal-directed gratifications [27]. Many viewers watch livestreams because they want to receive useful product information and valuable purchase recommendations from live streamers, who have similar preferences to viewer [99]. In livestream shopping, the streamers serve as entertainers and salespeople [100]. Exiting literatures posit that individuals usually experience smoother communications and better understandings when interacting with similar others [11]. Information from the similar others is perceived to be more reliable, useful and trustworthy [35,36,51]. Similarly, marketing scholars claimed that salespeople who share similarities with the customers are often seen as more effective because they can precisely identify customers' needs and provide personalized services [122]. Thus, it is assumed that viewers' identification with streamers lead to the development of viewers' utilitarian gratification. H2 is proposed as below:

H2. Identification with the streamers is positively related to utilitarian gratification.

Hedonic gratification (also referred to as perceived enjoyment) drives users to continuously use a new technology or social media service [42,124]. Socially, individuals prefer to interact with people whom they perceive to be similar to themselves because misunderstandings and conflicts are less likely to occur [112]. In the same vein, similarity attraction theory posits that people are more attracted to those who share similarities with themselves. Multiple studies have verified that people find interactions to be more enjoyable when they involve people who closely resemble themselves [2,11]. Hence, in the current study, identification with streamers was predicted to lead to the development of viewers' hedonic gratification. Hereby, H2 and H3 are proposed here:

H3. Identification with the streamers is positively related to hedonic gratification.

It has been repeatedly proved that perceived interactivity is related to gratification or satisfaction fulfillment [21]. For example, Chang [21] suggested that perceived interactivity helps to fulfill the users' gratification and further leads to their SNS continuance intention. In livestream shopping, interactivity affordance allows the consumers to ask questions during streams any time. Instead of just showing and introducing the products, the streamers can demonstrate the products and provide information at the request of the viewers [130]. In this case, the customers are more likely to get what they want with the assist of personalized shopping services. Thus, the users' utilitarian gratifications can be fulfilled. As to hedonic gratification, Wang [133] and Nambisan and Baron [107] found that interactions in s-commerce can bring about positive emotions, such as enjoyment and pleasure. Merely chatting with the live streamers and the other viewers can be fun [131]. Bargaining with the streamers for a lower price can also be enjoyable for some users [134]. Thus, H4and H5 are proposed here:

H4. Interactivity affordance leads to users' utilitarian gratifications.

H5. Interactivity affordance leads to users' hedonic gratifications.

2.4. User stickiness as a response

In light of the S–O–R model, response (R) is the behavioral reaction to organisms [103]. Stickiness is the extent to which s-commerce platforms can acquire and retain customers [57]. Hsu and Liao [58] proposed that platforms exhibit high stickiness when consumers repeatedly come back and spend a long time on these platforms. User stickiness, in e-commerce literatures, is considered a key predictor of customer loyalty and an essential factor in business success [18,93]. Studies have verified that user stickiness can develop from factors such as perceived interactivity [110], attachment [79], trust [94,132], identification [18], hedonic values [18], functional values [152], utilitarian values [18], perceived usefulness [34], perceived enjoyment [34] and satisfaction [89,116]. It has been empirically proved that perceived interactivity results in stickiness [37,111,139]. Besides, the link between identification and stickiness has been confirmed by Hsu et al. [57]. As mentioned above, individuals from the collectivistic cultures care more about social connections and belongingness than those from individualistic cultures do. Thus, it is assumed that interactivity affordance and identification with streamers are two important indicators of user stickiness in the Chinese context. Moreover, Xu et al. [140]

conducted an SNS study and revealed that user gratification is an important indicator of stickiness. Likewise, the media system dependency (MSD) theory posits that the fulfillment of user needs leads to the users' continuous use of the media [12]. Studies concerning technology acceptance have suggested that utilitarian and hedonic values drive individuals to increase the duration and frequency of platform use [7,9,69,118]. Thus, in the current study, the utilitarian and hedonic types of gratification were predicted to lead to user stickiness in the live-streaming commerce context. Hereby, H6-H11 are proposed as below. The hypothesized serial mediation model is presented in Fig. 1.

H6. Utilitarian gratification has a positive impact on user stickiness.

H7. Hedonic gratification is positively related to user stickiness.

H8. Interactivity affordance has a positive and significant influence on user stickiness.

H9. Identification is positively related to user stickiness.

H10. Identification together with utilitarian gratification mediate the Interactivity affordance-stickiness relationship.

H11. Identification together with hedonic gratification mediate the Interactivity affordance-stickiness relationship.

3. Methodology

3.1. Construct measurement

The present study used multiple items to measure constructs, as Churchill [26] suggested. The questionnaire was comprised of 5 constructs, measured with 18 question items. These question items were all adapted from previous studies, thus ensuring measurement reliability and validity. Interactivity affordance was measured using the modified versions of three items from a study by Lin et al. [86]. User stickiness and identification were assessed using seven items adapted from Li et al. [79]. Hedonic gratification was evaluated using four items adapted from studies conducted by Ma [99] and Gan and Li [42]. Utilitarian gratification was measured by four modified items from a study by Ma [99]. Because the question items were originally in English, an English major professor was invited to translate them into mandarin Chinese. Afterwards, a professional English–Chinese translator was hired to translate the questionnaire back into English to confirm the translation accuracy. All of the question items were further revised after a pilot study (n = 50) was performed. Table 1 demonstrates the question items and the sources.

3.2. Data collection

For data collection, the services of a professional survey company affiliated to Wenjuanxing.com were engaged in August 2020. The participants were asked how much they agreed with the indicator statements, and their answers were calculated using a 5-point Likert scale (strongly disagree–strongly agree). To ensure that all participants had experience using livestream shopping services, they were asked the screening question "Have you ever watched live-stream shopping?" at the start of the survey. After that, all the participants were required to provide their nicknames on the livestreaming platforms. Totally, 650 questionnaires were sent and 577 questionnaires were collected back and evaluated. After eliminating the incomplete responses, the responses that contained the same scores for
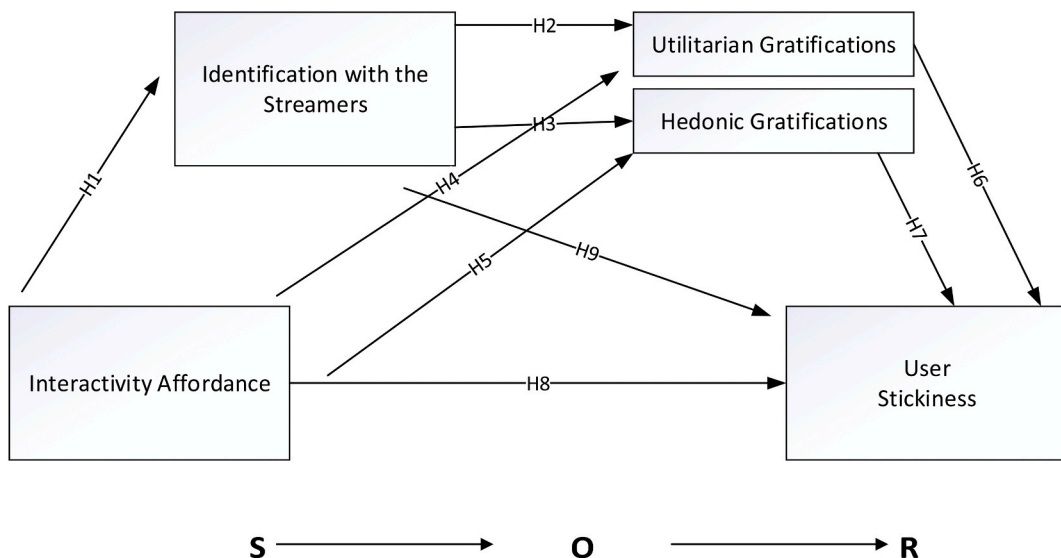

Fig. 1. Serial mediation model in the present study.

Table 1
Items and sources.

Constructs	Items	Source
Interactivity affordance (INT)	INT1 During livestream shopping, I can maintain two-way communication with live-streamers.	[86]
	INT2 During livestream shopping, I can ask questions and the streamers reply to my questions promptly.	
	INT3 During livestream shopping, I can obtain information that is specific to my needs from streamers.	
Identification (IDT)	IDT1 I feel that the streamers and I have similar personalities.	[79]
	IDT2 The streamers and I are similar in many ways.	
	IDT3 I feel that the streamers and I have similar values.	
	IDT4 I think my image overlap with the images of streamers.	
Utilitarian gratification (UTN)	UTN1 I find using livestream shopping to be very useful.	[99]
	UTN2 I find using livestream shopping to be very efficient.	
	UTN3 Livestream shopping is useful for finding high-quality products.	
	UTN4 Livestream shopping is useful for receiving product information.	
Stickiness (STK)	STK1 I would love to spend more time on livestream shopping platforms.	[79]
	STK2 I visit livestream shopping platforms frequently.	
	STK3 I usually spend a long time on livestream shopping platforms.	
Hedonic gratification (HED)	HED1 I find livestream shopping to be very enjoyable.	[99]
	HED2 I find livestream shopping to be very fun.	[42]
	HED3 I find livestream shopping to be a good method of relieving boredom.	
	HED4 The actual process of using livestream shopping services is pleasant.	

all question items and the responses that had been finished in an unrealistic short time (less than 3 min), the remaining 489 valid responses were analyzed. Table 2 presents the descriptive statistics of the participants.

4. Data analysis

4.1. Common method bias

Podsakoff et al. [109] pinpointed that the use of self-reported data collected from the same source may introduce common method bias (CMB). To eliminate the problem of common method bias, Harman's single factor test was undertaken in the present study, and its results demonstrated that the first factor comprise only 35.03% of the variance, lower than the 50% threshold suggested by Ylitalo [145]. Hereby, CMB was not a serious issue in the present study.

4.2. Measurement model

Before the hypothesized model was analyzed, the reliability and validity of all the constructs were evaluated using SPSS24 and AMOS24 software programs. All the composite reliability scores (CR) in Table 3 exceed 0.7, implying that the items exhibited good reliability [59]. All factor loadings were above the suggested cutoff value of 0.5, implying satisfactory convergent validity. Convergent validity was verified, with the average variance extracted (AVE) scores all exceeding 0.5 [38]. Table 4 indicates that each construct's square root of AVE was higher than its correlation coefficients with respect to other constructs; thus, discriminant validity was verified [38]. For the purpose of further eliminating the multicollinearity issue, variance inflation factor (VIF) was calculated. As illustrated in Table 4, all the independent variables' VIF values were below the threshold of 5 [74]. Thus, multicollinearity is not a serious issue in the present study.

4.3. Serial mediation analysis and results

The correlation examination results showed that H1-H3, H5-H7 were supported whereas H4 was not supported. H8 and H9 were verified with identification and utilitarian gratification as mediators. H8 and H9 were not confirmed with identification and hedonic

Table 2
Descriptive statistics of participants (N = 489).

Measure	Items	Frequency	Percentage (%)
Gender	Male	230	47.03
	Female	259	52.97
Age	≤18	32	6.53
	19–30	222	45.4
	31–40	67	34.15
	41–50	48	9.82
	51≤	20	4.1
Experience	≤1 year	95	19.43
	2–3years	365	74.64
	4 years ≤	29	5.93

Table 3

Reliability and convergent validity analysis.

Construct	Item	Unstd.	S.E.	t-value	P	Std.	SMC	CR	AVE
INT	INT1	1				0.677	0.458	0.855	0.666
	INT2	1.23	0.077	15.936	***	0.872	0.76		
	INT3	1.192	0.075	15.913	***	0.883	0.78		
IDT	IDT1	1				0.681	0.464	0.800	0.502
	IDT2	1.138	0.091	12.534	***	0.702	0.493		
	IDT3	1.18	0.089	13.278	***	0.786	0.618		
	IDT4	0.881	0.074	11.936	***	0.657	0.432		
UTN	UTN1	1				0.798	0.637	0.899	0.690
	UTN2	1.157	0.056	20.668	***	0.848	0.719		
	UTN3	1.15	0.053	21.707	***	0.887	0.787		
	UTN4	0.97	0.052	18.807	***	0.786	0.618		
STK	STK1	1				0.878	0.771	0.909	0.769
	STK2	0.906	0.036	25.196	***	0.882	0.778		
	STK3	0.898	0.036	24.786	***	0.87	0.757		
HED	HED1	1				0.827	0.684	0.899	0.691
	HED2	0.964	0.046	20.916	***	0.828	0.686		
	HED3	0.985	0.045	22.107	***	0.865	0.748		
	HED4	0.906	0.045	20.124	***	0.804	0.646		

Table 4

Discriminant validity test.

	AVE	VIF	UTN	HED	STK	INT	IDT
UTN	0.690	1.149	**0.831**				
HED	0.691	3.333	0.161	**0.831**			
STK	0.769	2.941	0.249	0.698	**0.877**		
INT	0.666	1.449	0.104	0.531	0.49	**0.816**	
IDT	0.502	1.666	0.308	0.584	0.52	0.417	**0.709**

Square root of AVE in bold on diagonals.

Off diagonals are Pearson correlation of constructs.

Note: INT, interactivity affordance; IDT, identification with the streamers.

UTN, utilitarian gratifications; STK, consumer stickiness; HED, hedonic gratifications.

gratification as mediators. The possible explanations are presented as follows.

The serial mediation model of the present study was tested using the SEM (bootstrapping) technique in AMOS 24. Compared to other mediation testing techniques (eg. SPSS process), SEM is advantageous in the following aspects: Firstly, SEM precisely assesses hidden variables with multiple indicators that are calculated with errors. Second, the SEM model adequacy can be evaluated by fit indices [60,66]. In the present study, the combinations of identification and utilitarian gratifications were assumed to mediate the relationship between interactivity affordance and user stickiness. Table 5 shows that the point estimate for the standardized indirect effect of interactivity affordance on user stickiness, with identification and utilitarian gratifications as mediators, was 0.157. The combinations of identification and utilitarian gratifications were valid mediators because the confidence intervals (CI) did not contain 0 (bias-corrected 95% CI [0.101, 0.227]; percentile 95% CI [0.098, 0.223]). The z-value was 5.233, which is above the cutoff value of

Table 5

Standardized direct, indirect, and total effects of the hypothesized model.

	Point estimate	Product of coefficients		Bootstrapping				
		SE	Z	Percentile 95% CI		Bias-corrected< percentile 95% CI		Two-tailed significance
				lower	upper	lower	upper	
Standardized direct effects								
INT-IDT-HED-STK	0.05	0.05	1	−0.016	0.181	−0.018	0.178	0.115
INT-IDT-UTN-STK	0.332	0.05	6.64	0.233	0.427	0.229	0.423	0.001 (**)
Standardized indirect effects								
INT-IDT-HED-STK	0.408	0.045	9.067	0.322	0.499	0.324	0.502	0.000 (***)
INT-IDT-UTN-STK	0.157	0.03	5.233	0.098	0.223	0.101	0.227	0.000 (***)
Standardized total effects								
INT-IDT-HED-STK	0.49	0.039	12.564	0.411	0.564	0.407	0.562	0.001 (**)
INT-IDT-UTN-STK	0.489	0.039	12.538	0.41	0.564	0.406	0.562	0.000 (***)

Standardized estimating of 10,000 bootstrap sample,**p < .01,***p < .001.

Note: INT, interactivity affordance; IDT, identification with the streamers.

UTN, utilitarian gratifications; STK, consumer stickiness; HED, hedonic gratification.

1.96. The point estimation for standard direct effects was 0.332. Direct effects were verified because the 95% CI with 10,000 bootstrap samples did not contain 0 (bias-corrected 95% CI [0.229, 0.423]; percentile 95% CI [0.233, 0.427]). The z-value was 6.64, which is above the threshold of 1.96. These results implied that the model was a partial mediation one. The results demonstrated a favorable model fit: χ2/df = 1.050, GFI = 0.980, AGFI = 0.970, CFI = 0.999, TLI = 0.999, RMESA = 0.010. All the fit indices fall into the recommended range (refer to Table 6, Model 2).

In addition, identification combined with hedonic gratifications were predicted to mediate the effects of interactivity affordance on user stickiness. The results revealed a point estimate of 0.408 for the standardized indirect effect of interactivity affordance on user stickiness, with identification and hedonic gratifications acting as mediators. The mediators were confirmed to be valid because the CIs did not contain 0 (bias-corrected 95% CI [0.324, 0.502]; percentile 95% CI [0.322, 0.499]). The z-value was 9.067, which is above the cutoff value of 1.96. The point estimation for standard direct effects was 0.05. Direct effects were not confirmed because the 95% CI with 10,000 bootstrap samples contained 0 (bias-corrected 95% CI [−0.018, 0.178]; percentile 95% CI [−0.016, 0.181]). The z-value was 1, which is less than the threshold of 1.96. These results indicated a full mediation model. The results demonstrated an adequate model fit: χ2/df = 2.083, GFI = 0.957, AGFI = 0.937, CFI = 0.981, TLI = 0.976, RMESA = 0.047. All the fit indices are within the suggested range (refer to Table 6, Model 1). Thus, H10 and H11 were supported. Table 5 presents the comparison of standardized indirect effects, standardized direct effects, and standardized total effects of interactivity affordance on user stickiness, with identification, utilitarian gratification, and hedonic gratification acting as mediators. The standardized coefficients are presented in Fig. 2.

5. Discussion

Although stickiness is critical for business success, very little research has explored the factors that give rise to user stickiness in the livestreaming context. Using the S–O–R framework, the present study investigated, in the live-streaming context, the relationship between interactivity affordance and user stickiness, with identification and gratifications (utilitarian and hedonic) as mediators. The findings of the present study correspond to those of Zhao et al. [151], who have verified the link between interactivity affordance and identification. In accordance with Kang and Schuett [75] and Gwebu and Wang [43], identification was revealed to be a significant predictor of utilitarian and hedonic gratifications. The research findings indicated that hiring streamers who share similarities with the customers is essential for business success because the customers' utilitarian and hedonic gratifications can be fulfilled through the interactions with those streamers. Interestingly, the findings showed that identification with the streamers does not necessarily lead to user stickiness. It hints that being similar to the customers is far from enough, the streamers should take time to identify, understand and satisfy the customer's needs in order to increase the retention rate. Besides, in tune with the findings of Xu et al. [140], both utilitarian and hedonic gratifications lead to user stickiness. The research findings suggested that accommodating customers' utilitarian and hedonic needs is a gateway to retaining customers. Moreover, roughly similar to Guo and Li [41], interactivity affordance was found positively related to hedonic gratification. In contrary to the findings of Guo and Li [41], interactivity affordance was not directly related to utilitarian gratification in the current study. The findings showed that the IT affordance alone does not necessarily fulfill the users' gratification. Instead, it is affordance-assisted interpersonal communications that fulfill the consumers' needs. In other words, both technical (interactivity affordance) and social (live streamers) components play pivotal roles in shaping consumer behaviors the livestream commerce context. Notably, the direct relationship between interactivity affordance and user stickiness was verified with identification and hedonic gratification as mediators. However, with identification and hedonic gratification as mediators, the direct relationship was not supported. Collectively, the findings indicated that identification and gratifications (utilitarian and hedonic) mediate the relationship between interactivity affordance and user stickiness sequentially. The serial mediation model provides new insight into the mechanism through which interactivity affordance affects user stickiness. The findings indicate that interactivity affordance affects identification (a cognitive process) and leads to gratification (affective responses) and eventually consumer stickiness.

6. Implications and limitations

### 6.1. Theoretical implications

The theoretical and practical implications of the present study are presented as follows.

First of all, although e-commerce has been extensively studied, few studies have explored user stickiness in e-commerce [79]. Based on what has been mentioned above, user stickiness is imperative for the live stream commerce development. Therefore, the current study fills a gap in the e-commerce literature in this area. Besides, there has been controversy and inconsistent results concerning the effects of perceived interactivity on stickiness [104,110]. Thus, the current study extends the existing knowledge by elucidating the mechanisms through which interactivity affordance affects stickiness in the live-streaming context. Besides, the framework of the

Table 6
Model fit index.

Index	χ2/df	GFI	AGFI	CFI	RMSEA	TLI
Recommended criteria	<3.00	0.80<	0.80<	0.90<	<0.08	0.90<
Model1	2.083	0.957	0.937	0.981	0.047	0.976
Model2	1.050	0.98	0.97	0.999	0.01	0.999

Mediation Model 1
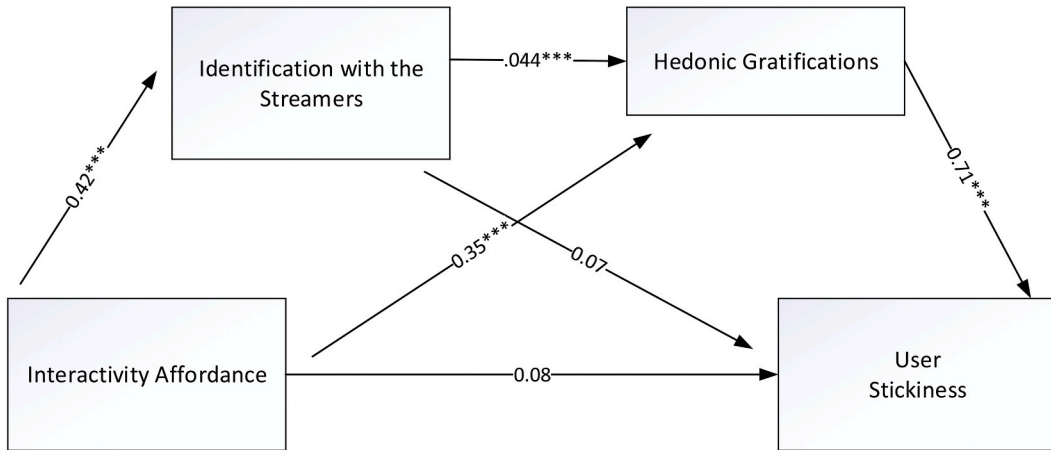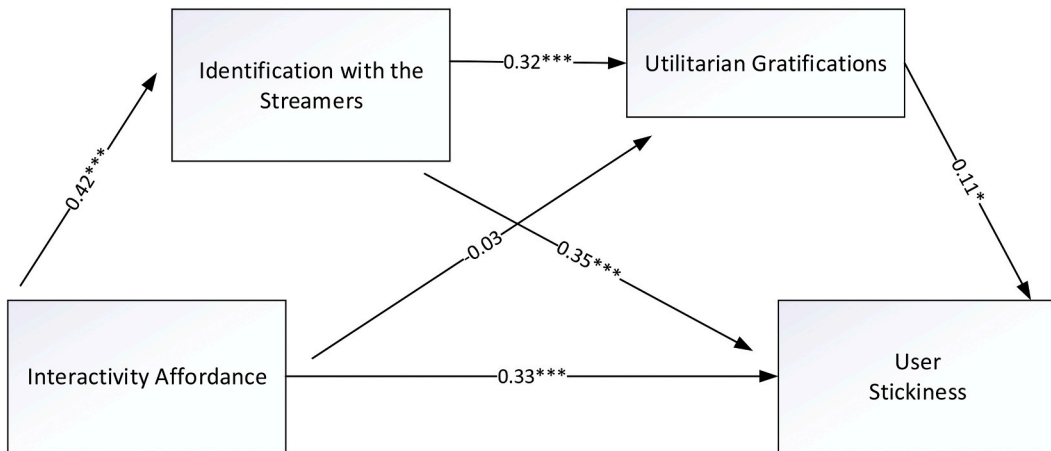

Mediation Model 2

Fig. 2. Standardized coefficients of the mediation models.

present study encompasses the essential components of live streaming. Although many scholars have indicated that live streaming is best characterized by interactivity and livestreamers [48,86,130], very few of them have considered the influence of both in the theoretical framework. In this case, it is fair to say that the current study widens the livestream commerce literature by comprehensively capturing the essential components of livestream shopping. In addition, the present study expands on previous research by using its theoretical framework to further examine interactivity affordance and its effect on users' identification with streamers. The findings of the present study contribute towards a better understanding of IT affordance in the live streaming context.

Second, the comprehensive framework that incorporates interactivity affordance (S), identification (O-cognitive) and gratification (O-affective) provides holistic insights into user stickiness (R) in the live-streaming context. Although the S–O-R theory underlines the existence of multiple inner states in an organism , most of the existing studies include either cognitive or affective factors as the internal responses. Therefore, the present study provides a holistic perspective that combines environmental factors, cognitive processes, and affective responses to clarify consumer behaviors in e-commerce. Additionally, the findings of the current study provide a new insight into the application of the S–O-R model for the future research. Moreover, Hirschman and Holbrook [63] portrayed the consumers as "problem solvers" or "enjoyment seekers". By the same token, the current study proved that fulfillment of consumers' hedonic and utilitarian gratifications is essential for customer retention. Besides, the serial mediation analysis results showed that different types of gratification function differently in the theoretical framework. Thus, the U&G theory was verified as effective for explaining consumer behaviors in the live-streaming context. Additionally, the results offer powerful evidence for the necessity to

categorize gratifications in studies. Moreover, the present study extends the scope of U&G theory by treating identification as an antecedent of gratification. Notwithstanding a large number of scholars have used U&G to explain user behaviors in the live streaming context [50,85,99], very few of them have built a causal relationship between identification and gratification. As far as the author knows, the present study is among the first studies linking social identity theory and the U&G theory in the live-streaming context. In future s-commerce studies, the findings of the present study can be utilized as a theoretical basis, and identification can be included as the antecedent of gratification.

Third, the present study contributes to the connections between the interactivity affordance, identification, gratification and the user stickiness. Drawing upon the IT affordance theory, affordances create possibilities for actions. The findings of the present study revealed that the relationship between interactivity affordance and user stickiness is influenced by the inner mechanisms. Thus, the present study extends the scope of the IT affordance theory by considering the conditions under which the affordance induces human behavior. The research findings can serve as theoretical bases for future studies concerning IT affordances.

Finally, from the perspective of methodology, the current study examined the serial mediation model using the bootstrapping technique in Amos 24. Most of the existing mediation studies adopted SPSS Process, which is more appropriate for observable variables, to analyze data. Thus, the data analysis method of the current study is advantageous in the following ways: (1) SEM considers hidden variables with multiple indicators that are calculated with errors. Put simply, the results are more precise. (2) SEM model fit indices can be used to evaluate the adequacy of a proposed model [60,66]. Thus, the current study may provide scholars new insights into the mediation analysis approach.

6.2. Practical implications

Practically, the research findings are beneficial to retailing and marketing practitioners.

First, the present study expands on previous research on live-stream commerce by presenting a framework that considers the indicators of user stickiness. The empirical evidence presented in the present study may aid practitioners in developing strategies for retaining existing users and gaining a competitive edge in the retail market.

Second, the findings indicate that platform developers should integrate more effective tools (such as bullet screens) to aid two-way and synchronic communication between viewers and streamers. Furthermore, streamers are encouraged to acquire more product knowledge and refine their broadcasting skills such that they can better understand consumers' needs and provide personalized and high-quality information. These measures allow consumers to develop a stronger sense of control, which is an essential component of interactivity affordance [6].

Third, the findings of the present study suggest that understanding the characteristics of a customer base and selecting appropriate streamers is essential for retail marketers. The findings reveal that consumer identification with live streamers involves satisfying consumers' hedonic and utilitarian needs, thereby leading to user stickiness. In other words, a streamer who has similarities with the consumers may be perceived to be persuasive and fun. Generation cohort theory posits that individuals of the same age and generation usually share the same values and beliefs. Therefore, selecting a streamer who is of similar age to target viewers is recommended to enhance viewers' sense of identification with the streamer. Streamers should also have extensive knowledge of their followers and adjust their communication strategy to enhance their followers' perception of similarity. For example, streamers can disclose some personal information during their live streams because their viewers may identify similarities through such information [73]. Streamers can also speak in a style similar to that used by their viewers because linguistic style can act as a symbol of in-group membership and help viewers to identify similarities with the streamers [30,45]. Finally, streamers should dress appropriately, because clothing is another key marker of social identity [96].

Fourth, the findings indicate that the utilitarian and hedonic types of gratification lead to user stickiness in the live streaming context. Therefore, streamers can acquire more product knowledge to enhance their ability to provide useful and reliable information to consumers and help consumers to achieve utilitarian gratification. Furthermore, streamers can organize entertaining activities such as sweepstakes and flash sales during live streams to fulfill consumers' hedonic needs. They can also present products using audio and video and through verbal and nonverbal means to enhance consumers' enjoyment of live streams. Additionally, platform developers can incorporate engaging features such as funny emojis into their platforms to help their viewers achieve hedonic gratification.

6.3. Limitations and future research

Although we obtained meaningful results, the present study has several limitations:

First, similar to the frameworks used by Tsao [127] and Wang et al. [132], the framework of the present study does not include control variables. Kim et al. [68] found that shopping experience was not a significant control variable for channel stickiness. Shao et al. [116] discovered that gender and education background were not valid control variables for SNS stickiness; however, other variables such as age, time spent on livestream platforms and the frequency of watching livestreams can still be used as control variables in the future studies to explore stickiness. The internal validity of the research can be improved by excluding third effects. SNS studies have repeatedly verified that age influences the behavior of SNS users [5,8]. Therefore, whether users of various ages exhibit different levels of platform stickiness is a topic worth further exploration. Besides, as the socioemotional selectivity theory [25] suggests, people's motivations change as they transition through the various stages of their lives; thus, people of different ages and generations may have different motivations for using livestream platforms. In addition, product category was confirmed as a significant control variable of channel stickiness [68]. Kim et al. [76] suggested that users' social media stickiness depends on individual differences. Hence, it would be a wise idea to include product category and individual differences (eg. personalities) as control

variables or independent variables in the future.

Second, although the framework of the present study divides gratification into hedonic and utilitarian gratification, future studies can further consider other types of gratification. Gan and Li [42] claimed that SNS users' continuance intention is driven by social gratification. Ma [99] suggested that social gratification triggers consumers' livestream shopping intention; thus, social gratification maybe another indicator that triggers user stickiness in the live streaming context.

Third, stickiness can be categorized into instrumental and social stickiness [143]. Thus, it would be a great idea to categorize stickiness in the future studies. By doing so, the practitioners can make targeted plans to enhance consumers' specific type of stickiness.

Fourth, scholars have indicated that consumer behaviors are influenced by shopping orientations [99,128]; specifically, customers who are experience-oriented care more about the hedonic values of platforms, whereas task-focused customers are more concerned about the utilitarian values of platforms. Therefore, consumers' shopping orientations should be examined in future studies.

Fifth, in order to precisely position the functions that lead to consumers' identification and stickiness, future studies are suggested to include IT affordance dimensions (two-way communication, synchronicity, active control) in the framework. By doing so, the platform developers can benefit from the research findings and advance specific functions to boost user stickiness.

Sixth, existing literature revealed that customer-to-customer interactions affect consumers' shopping experience [153]. Thus, it would be interesting to further investigate if consumers' interaction and identification with other customers breed gratification and platform stickiness. Moreover, the present study was conducted in China and involved Chinese users. Shavitt and Barnes [115] have suggested that consumer behavior may vary across cultures. Thus, researchers are supposed to generalize the findings of the present study to other contexts with caution, and future studies should replicate the present study using other contexts and samples.

Finally, even though interactivity affordance is the most important affordance of s-commerce, it is highly suggested to further explore the effects of other affordances on customer stickiness. Besides, in order to further confirm the casual relationship between interactivity affordance and user stickiness, it is plausible to employ experimental methods in the future studies.

Production notes

Author contribution statement

Yingying Ma: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Funding statement

Data availability statement

The authors do not have permission to share data.

Declaration of interest's statement

The authors declare no conflict of interest.

Appendix A

Selected literature

Studies	Theoretical background	Antecedents	Dependent variable	Underlying mechanism	Moderators
The current study	S–O-R/IT affordances theory/Identification theory/U&G	interactivity affordance	consumer stickiness	identification/utilitarian gratification/hedonic gratification	N.A.
Chen et al. (2022)	dual-process model	live-streaming features (real-time communication/product interactivity/perceived authenticity/perceived enjoyment/continence)	purchase intention	product quality uncertainty/product fit uncertainty	habit
Liao et al. (2022)	para-social interaction theory/flow theory	communication style (Interaction orientation)	purchase intention	immersion/para-social interaction	streamers' expertise/ attractiveness
Chen and Liao (2022)	social presence theory		watching intention	social presence	

(*continued*)

Studies	Theoretical background	Antecedents	Dependent variable	Underlying mechanism	Moderators
		sense of community/ Emotional support/ interactivity			streamers' attractiveness
Baersch et al. (2022)	value theory	two-way communication/ synchronicity	stickiness intention	functional value/hedonic value/social presence	N.A.
Ma et al. (2022)	S–O-R model/media richness theory	interactivity/visualization/ entertainment/ professionalization	purchase intention	social presence (mediator)/ psychological distance (mediator)/trust (mediator)/engagement (mediator)	gender/platform differences
Guo et al. (2022)	source theory/value theory	streamer characteristics (beauty/warmth/expertise/ humor/passion)	watching intention/ purchase intention	utilitarian value (mediator)/hedonic value (mediator)	N.A.
Chou et al. (2022)	theory of narrative transportation	Value co-creation	intention for continued use	entertainment/social presence/self-reference	social influence
Chen et al. (2022)	U&G	social interaction/pass time/ entertainment/perceived utility/habit	purchase intention/gifts giving intention	emotional engagement/ social presence/immersion	N.A.
Cao et al., (2022)	self-efficacy theory/ value-based adoption models	perceived usefulness/ perceived entertainment/ general self-efficacy	customer engagement	Live-stream commerce self-efficacy/perceived value	N.A.
Lv et al. (2022)	attention-interest-desire-action (AIDA model)	informativity/entertainment/ interactivity	immediate buying behavior/ continuous watching intention	product interest/live streaming interest/buying desire	gender/age/ watching experience/time pressure
Zhao and Bacao (2021)	UTAUT2/flow theory/ S–O-R model	trust/performance expectancy/effort expectancy/ social influence/hedonic motivation	perceived value/ behavioral intention	flow	gender/age
Ma (2021b)	IS success model/ media richness theory/ source credibility model	media richness/source expertise	customer satisfaction	information quality/service quality/argument quality/ social –presence (mediator)/trustworthiness (mediator)	N.A.
Ma (2021a)	U&G/network externality theory	perceived network size	purchase intention	shopping orientations (mediator)/perceptions of digital celebrities (mediator)/ perceived enjoyment/ perceived interaction/ social presence/perceived utility/self-presentation	N.A.
Liu et al. (2021)	intimacy theory	personal brand essence/personal brand heritage/realistic plot/ credible advertising message/customer response expertise/customer response speed	online engagement	authenticity/similarity/ customer response capability/intimacy	N.A.
Li et al. (2021)	attachment theory/ socio-technical approach	interaction/identification/ synchronicity/vicarious expression	visit duration/user retention	emotional attachment to streamers/platform attachment	N.A.
Fei et al. (2021)	S–O-R	herding message/interaction text	purchase intention	endogenous attention/ exogenous attention	anchor attractiveness
Lin (2021)	social presence theory	para-social relationship	virtual gift sending intention	enjoyment/loyalty/trust/ satisfaction	social presence
Li and Peng (2021)	attachment theory/ flow theory/S–O-R	trustworthiness/expertise/ attractiveness/telepresence/ instant feedback/ interactivity/entertainment	gift sending intention	emotional attachment/flow experience	N.A.
Sun and Zhang (2021)	technology acceptance model	perceived ease of use	payment intention	satisfaction/perceived enjoyment/perceived usefulness	perceived enjoyment/ satisfaction
Guo et al. (2021)	trust transfer theory	trust in community trust in members/trust in broadcasters/trust in products	customer engagement	swift guanxi (mediator)	N.A.
Lakhan et al. (2021)		entertaining/opinion leaders			N.A.

(*continued*)

Studies	Theoretical background	Antecedents	Dependent variable	Underlying mechanism	Moderators
	S–O-R/consumer perception value theory		consumers purchase intention	trust/perceived functional value/perceived emotional value	
Ming et al. (2021)	S–O-R/flow theory	social presence of live streaming platforms/viewers/streamers/telepresence	impulsive buying behavior	consumer trust/flow state	consumers' sense of power
Liu and Oda (2021)	source credibility theory	attractiveness/expertise/trustworthiness	trust in live streamers/trust in products	N.A.	N.A.
Luo et al. (2021)	persuasion model/Latent dirichlet allocation topic extraction model/Aristotle's rhetoric skills/grounded theory	personality/reward/emotion/logic/exaggeration	sales	N.A.	types of products
Lee and Chen (2021)	S–O-R	attractiveness/expertise/trustworthiness/product usefulness/purchase convenience/product price	urge to buy impulsively	perceived enjoyment/perceived ease of use	N.A.
Hsu and Lin (2021)	U&G/flow theory	entertainment/informativeness/sociability/interactivity/telepresence	continuance intention to use live stream services	satisfaction/flow	N.A.
Xu and Tayyab (2021)	media system dependency theory	immersive experience	media dependency	Attitude (mediator)	frequency of use
Long and Tefertiller (2020)	U&G	real-time communication/escape/fun seeking/partnership seeking/social interaction	motives and uses of live streaming services	N.A.	gender
Xu et al. (2020)	S–O-R	streamer attractiveness/para-social interaction/information quality	hedonic consumption/impulsive consumption/social sharing	cognitive assimilation (mediator)/arousal (mediator)	N.A.
Zhang et al. (2020)	Social exchange theory	Information quality/interaction quality	purchase intention	swift guanxi (mediator)	N.A.
Kang et al. (2020)	S–O-R	responsiveness/personalization	customer engagement	tie strength (mediator)	tenure of membership/popularity
Zhang et al. (2020)	construal level theory	live streams strategy	online purchase intention	psychological distance/perceived uncertainty	product type
Park and Lin (2020)	celebrity endorsement/match-up hypothesis	wanghong-product fit/live content-product fit/self-product fit	intention to buy	wanghong trustworthiness/attractiveness/utilitarian attitude/hedonic attitude	N.A.
Chen et al. (2020)	ELM model/trust transfer theory	central route (perceived product quality, brand awareness)/peripheral route (perceived product knowledge of streamers, other members' endorsement, value similarity)	purchase intention/willingness to pay more	trust in product/trust in streamer	N.A.
Heo et al. (2020)	social capital theory/credibility theory	trust/norm/network/attractiveness/expertise/trustworthiness	social capital	N.A.	N.A.
Hsu et al. (2020)	U&G/media richness theory	perceived media richness	loyalty to livestream channels	entertainment/informativeness/sociability	N.A.
Lim et al. (2020)	social cognitive theory/model of para-social relationship	wishful identification/emotional engagement	repeated viewing of live-streaming games	Para-social relationship	N.A.
Xue et al. (2020)	S–O-R model	personalization/responsiveness/entertainment/mutuality/perceived control	social commerce engagement	perceived usefulness (mediator)/perceived risk (mediator)/psychological distance (mediator)	susceptibility to informative influence
Singh et al. (2020)	perceived value theory	perceived enjoyment/perceived risk/addiction/		personal innovativeness/perceived value	N.A.

(*continued*)

Studies	Theoretical background	Antecedents	Dependent variable	Underlying mechanism	Moderators
		expectancy (effort, performance)/values (convenience, monetary, emotional, social)	continued use of live streaming services		
Kim and Kim (2020)	U&G/social identity theory	personal integration/social integration/tension release/affective gratification	social well-being/loneliness of the viewers	flow/satisfaction	N.A.
Cheng et al. (2020)	ELM model	argument quality/source credibility	loyalty to broadcaster	trust belief toward the broadcaster	product involvement/product scarcity
Ho and Rajadurai (2020)	theory of absorptive capacity/diffusion of innovation theory	convenience/interactivity trust/information efficacy	product knowledge	knowledge acquisition/knowledge assimilation	N.A.
Chen (2019)	Post-acceptance model	perceived usefulness/confirmation/convenience/entertainment/interaction	continuous purchase intention	customer satisfaction	N.A.
Sun et al. (2019)	affordance theory	visibility/metavoicing/guidance shopping	purchase intention	immersion/presence	N.A.
Hou et al. (2019)	U&G	interactivity/social status display/humor appeal/sex appeal	continuous watching intention/consumption intention	N.A.	N.A.
Lin et al. (2019)	IT affordance/culture	interactivity/stickiness/WOM	purchase intention	mutual understanding/reciprocal favor/relationship harmony	N.A.
Chen et al. (2019)	mean-ends chain of lifestyle theory/socialized charismatic leadership theory/product uncertainty theory	value transmission/vicarious experience learning/product presentation	purchase intention	product uncertainty/lifestyle fit uncertainty/	Interactivity/communication visibility
Zhou et al. (2019)	cognitive transactional theory	social distance	broadcast intention	challenge stressors/hindrance stressors	material values
Wang and Wu (2019)	multimedia learning theory/information foraging theory	product interactivity/communication immediacy/peer cues	user attitude/user intention	product evaluation/user serendipity	N.A.
Cai et al. (2018)	consumer motivation theories	hedonic motivations/utilitarian motivations	shopping intention	N.A.	N.A.
Todd and Melancon (2018)	credibility model	perceptions of source credibility	consumer motivation to view livestream broadcasts	N.A.	gender of streamers
Wongkitrungrueng and Assarut (2018)	shopping values/social presence theory	utilitarian value/hedonic value/symbolic value	customer engagement	trust in products/trust in sellers	N.A.
Chen and Lin (2018)	flow theory	flow/entertainment/social interaction/endorsement	Intention to watch livestream shows	attitude/perceived value	gender and age of viewers
Ang et al. (2018)	social impact theory	social presence/synchronicity	search intention/subscribe intention	authentic consumer viewing experience (mediator)	social viewing strategy
Hu et al. (2017)	social identity theory	individual experience/co-experience	continuous watching intention	broadcaster identification/group identification	live streaming genres
Bründl et al. (2017)	technology acceptance model	co-experience	actual use	perceived enjoyment/perceived ease of use/perceived usefulness	N.A.

References

[1] A.M. Aladwani, Compatible quality of social media content: conceptualization, measurement, and affordances, Int. J. Inf. Manag. 37 (6) (2017) 576–582.

[2] S. Al-Natour, I. Benbasat, R. Cenfetelli, The adoption of online shopping assistants: perceived similarity as an antecedent to evaluative beliefs, J. Assoc. Inf. Syst. Online 12 (5) (2011) 2.

[3] B.E. Ashforth, F. Mael, Social identity theory and the organization, Acad. Manag. Rev. 14 (1) (1989) 20–39.

[4] S. Baersch, L. Richard, M. Siepermann, Live-Stream Shopping Is Landing in Germany: an Analysis of the Stickiness Intention of German Customers, 2022.

[5] S.J. Barnes, A.D. Pressey, E. Scornavacca, Mobile ubiquity: understanding the relationship between cognitive absorption, smartphone addiction and social network services, Comput. Hum. Behav. 90 (2019) 246–258.

[6] H. Bao, B. Li, J. Shen, F. Hou, Repurchase Intention in the Chinese E-Marketplace, Industrial Management & Data Systems, 2016.

[7] R. Buettner, Towards a New Personal Information Technology Acceptance Model: Conceptualization and Empirical Evidence from a Bring Your Own Device Dataset, 2015.

[8] V. Barker, A generational comparison of social networking site use: the influence of age and social identity, Int. J. Aging Hum. Dev. 74 (2) (2012) 163–187.

[9] A. Burton-Jones, G.S. Hubona, The mediation of external variables in the technology acceptance model, Inf. Manag. 43 (6) (2006) 706–717.

[10] L. Berkowitz, Towards a general theory of anger and emotional aggression: implications of the cognitive-neoassociationistic perspective for the analysis of anger and other emotions, in: Perspectives on Anger and Emotion, Lawrence Erlbaum Associates, Hillsdale. NJ, 1993, pp. 1–46.

[11] E. Berscheid, E.H. Walster, Interpersonal Attraction, McGraw-Hill, College, 1978.

[12] S.J. Ball-Rokeach, M.L. DeFleur, A dependency model of mass-media effects, Commun. Res. 3 (1) (1976) 3–21, https://doi.org/10.1177/009365027600300101.

[13] C.D. Chen, Q. Zhao, J.L. Wang, How livestreaming increases product sales: role of trust transfer and elaboration likelihood model, Behav. Inf. Technol. 41 (2022) 3.

[14] W.K. Chen, C.W. Chen, A.D.K. Silalahi, Understanding consumers' purchase intention and gift-giving in live streaming commerce: findings from SEM and fsQCA, Emerging Sci. J. 6 (3) (2022) 460–481.

[15] H. Chen, H. Chen, X. Tian, The dual-process model of product information and habit in influencing consumers' purchase intention: the role of live streaming features, Electron. Commer. Res. Appl. (2022), 101150.

[16] CNNIC, Statistical report on Internet development in China, HYPERLINK "http://www.cnnic.net.cn/hlwfzyj/hlwxzbg/hlwtjbg/202102/P020210203334633480104.pdf" \o, http://www.cnnic.net.cn/hlwfzyj/hlwxzbg/hlwtjbg/202102/P020210203334633480104.pdf, 2020, http://www.cnnic.net.cn/hlwfzyj/hlwxzbg/hlwtjbg/202102/P020210203334633480104.pdf.

[17] C.D. Chen, Q. Zhao, J.L. Wang, How Livestreaming Increases Product Sales: Role of Trust Transfer and Elaboration Likelihood Model, Behaviour & Information Technology, 2020, pp. 1–16.

[18] M.H. Chen, K.M. Tsai, An empirical study of brand fan page engagement behaviors, Sustainability 12 (1) (2020) 434.

[19] L.Y. Chen, The Effects of livestream shopping on customer satisfaction and continuous purchase intention, Int. J. Adv. Stud. Comput. Sci. Eng. 8 (4) (2019) 1–9.

[20] J. Cai, D.Y. Wohn, A. Mittal, D. Sureshbabu, Utilitarian and hedonic motivations for live streaming shopping, in: Proceedings of the 2018 ACM International Conference on Interactive Experiences for TV and Online Video, 2018. June, pp. 81–88.

[21] C.M. Chang, Understanding Social Networking Sites Continuance, Online Information Review, 2018.

[22] C. Chapple, F. Cownie, An investigation into viewers' trust in and response towards disclosed paid-for-endorsements by YouTube lifestyle vloggers, J. Promot. Commun. 5 (2) (2017).

[23] T.K. Chan, C.M. Cheung, Z.W. Lee, The state of online impulse-buying research: a literature analysis, Inf. Manag. 54 (2) (2017) 204–217.

[24] H.J. Chang, M. Eckman, R.N. Yan, Application of the Stimulus-Organism-Response model to the retail environment: the role of hedonic motivation in impulse buying behavior, Int. Rev. Retail Distrib. Consum. Res. 21 (3) (2011) 233–249.

[25] L.L. Carstensen, Evidence for a life-span theory of socioemotional selectivity, Curr. Dir. Psychol. Sci. 4 (5) (1995) 151–156.

[26] G.A. Churchill Jr., A paradigm for developing better measures of marketing constructs, J. Market. Res. 16 (1) (1979) 64–73.

[27] Z. Deng, Y. Lu, K.K. Wei, J. Zhang, Understanding customer satisfaction and loyalty: an empirical study of mobile instant messages in China, Int. J. Inf. Manag. 30 (4) (2010) 289–300.

[28] A.R. Dennis, R.M. Fuller, J.S. Valacich, Media, tasks, and communication processes: a theory of media synchronicity, MIS Q. 32 (3) (2008) 575–600.

[29] K. Eyal, A.M. Rubin, Viewer aggression and homophily, identification, and parasocial relationships with television characters, J. Broadcast. Electron. Media 47 (1) (2003) 77–98.

[30] P. Eckert, Jocks and Burnouts: Social Categories and Identity in the High School, Teachers college press, 1989.

[31] FORWARD Business information. https://bg.qianzhan.com/report/detail/1703101733143305.html.

[32] M. Fei, H. Tan, X. Peng, Q. Wang, L. Wang, Promoting or attenuating? An eye-tracking study on the role of social cues in e-commerce livestreaming, Decis. Support Syst. 142 (2021), 113466.

[33] T. Friedrich, S. Schlauderer, S. Overhage, The impact of social commerce feature richness on website stickiness through cognitive and affective factors: an experimental study, Electron. Commer. Res. Appl. 36 (2019), 100861.

[34] T. Friedrich, S. Schlauderer, S. Overhage, Some things are just better rich: how social commerce feature richness affects consumers' buying intention via social factors, Electron. Mark. (2019) 1–22.

[35] S. Fu, Q. Yan, G.C. Feng, Who will attract you? Similarity effect among users on online purchase intention of movie tickets in the social shopping context, Int. J. Inf. Manag. 40 (2018) 88–102.

[36] A.J. Flanagin, K.P. Hocevar, S.N. Samahito, Connecting with the user-generated Web: how group identification impacts online information sharing and evaluation, Inf. Commun. Soc. 17 (6) (2014) 683–694, https://doi.org/10.1080/1369118X.2013.808361.

[37] C.P. Furner, P. Racherla, J.S. Babb, Mobile app stickiness (MASS) and mobile interactivity: a conceptual model, Market. Rev. 14 (2) (2014) 163–188.

[38] C. Fornell, D.F. Larcker, Evaluating structural equation models with unobservable variables and measurement error, J. Market. Res. 18 (1) (1981) 39–50.

[39] Y. Guo, K. Zhang, C. Wang, Way to success: understanding top streamer's popularity and influence from the perspective of source characteristics, J. Retailing Consum. Serv. 64 (2022), 102786.

[40] L. Guo, X. Hu, J. Lu, L. Ma, Effects of Customer Trust on Engagement in Live Streaming Commerce: Mediating Role of Swift Guanxi, Internet Research, 2021.

[41] J. Guo, L. Li, Exploring the relationship between social commerce features and consumers' repurchase intentions: the mediating role of perceived value, Front. Psychol. 12 (2021) 775056, 775056.

[42] C. Gan, H. Li, Understanding the effects of gratifications on the continuance intention to use WeChat in China: a perspective on uses and gratifications, Comput. Hum. Behav. 78 (2018) 306–315.

[43] K.L. Gwebu, J. Wang, Adoption of open source software: the role of social identification, Decis. Support Syst. 51 (1) (2011) 220–229.

[44] J.J. Gibson, The Ecological Approach to Visual Perception, Lawrence Erlbaum, Hillsdale, NJ, 1986.

[45] J.J. Gumperz, Discourse Strategies, vol. 1, Cambridge University Press, 1982.

[46] Y. Huang, Y.H. Lee, G. Chang, J. Ma, G. Wang, Broadcasters' leadership traits and audiences' loyalty with the moderating role of self-construal: an exploratory study, Front. Psychol. 12 (2021), 605784.

[47] M. Hu, S.S. Chaudhry, Enhancing Consumer Engagement in E-Commerce Live Streaming via Relational Bonds, Internet Research, 2020.

[48] J. Heo, Y. Kim, J. Yan, Sustainability of live video streamer's strategies: live streaming video platform and audience's social capital in South Korea, Sustainability 12 (5) (2020) 1969.

[49] C.L. Hsu, J.C.C. Lin, Y.F. Miao, Why are people loyal to live stream channels? the perspectives of uses and gratifications and media richness theories, Cyberpsychol., Behav. Soc. Netw. 23 (5) (2020) 351–356.

[50] F. Hou, Z. Guan, B. Li, A.Y.L. Chong, Factors Influencing People's Continuous Watching Intention and Consumption Intention in Live Streaming: Evidence from China, Internet Research, 2019.

[51] B. Hernández-Ortega, Don't believe strangers: online consumer reviews and the role of social psychological distance, Inf. Manag. 55 (1) (2018) 31–50.

[52] K. Hwang, Q. Zhang, Influence of parasocial relationship between digital celebrities and their followers on followers' purchase and electronic word-of-mouth intentions, and persuasion knowledge, Comput. Hum. Behav. 87 (2018) 155–173.

[53] N. Hajli, J. Sims, A.H. Zadeh, M.O. Richard, A social commerce investigation of the role of trust in a social networking site on purchase intentions, J. Bus. Res. 71 (2017) 133–141.

[54] M. Hu, M. Zhang, Y. Wang, Why do audiences choose to keep watching on live video streaming platforms? An explanation of dual identification framework, Comput. Hum. Behav. 75 (2017) 594–606.

[55] L.T. Huang, Flow and social capital theory in online impulse buying, J. Bus. Res. 69 (6) (2016) 2277–2283.

[56] X. Hu, Q. Huang, X. Zhong, R.M. Davison, D. Zhao, The influence of peer characteristics and technical features of a social shopping website on a consumer's purchase intention, Int. J. Inf. Manag. 36 (6) (2016) 1218–1230.

[57] C.L. Hsu, J.C.C. Lin, Effect of perceived value and social influences on mobile app stickiness and in-app purchase intention, Technol. Forecast. Soc. Change 108 (2016) 42–53.

[58] C.L. Hsu, Y.C. Liao, Exploring the linkages between perceived information accessibility and microblog stickiness: the moderating role of a sense of community, Inf. Manag. 51 (7) (2014) 833–844.

[59] J.F. Hair Jr., W.C. Black, B.J. Babin, R.E. Anderson, Multivariate Data Analysis: A Global Perspective, seventh ed., Pearson Education International, 2010.

[60] L.T. Hu, P.M. Bentler, Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives, Struct. Equ. Model.: A Multidiscip. J. 6 (1) (1999) 1–55.

[61] G. Hofstede, Cultures and Organizations: Software of the Mind, Graw-Hill Book Company, Mc, 1991.

[62] M.B. Holbrook, R. Batra, Assessing the role of emotions as mediators of consumer responses to advertising, J. Consum. Res. 14 (3) (1987) 404–420.

[63] E.C. Hirschman, M.B. Holbrook, Hedonic consumption: emerging concepts, methods and propositions, J. Market. 46 (3) (1982) 92–101.

[64] iiMedia, Statistical Report on Live-Stream Commerce Development in China, 2021. https://report.iimedia.cn/repo70/39315.html?acPlatCode=iimedia&acFrom=1061bottom.

[65] T. Islam, J. Wei, Z. Sheikh, Z. Hameed, R.I. Azam, Determinants of compulsive buying behavior among young adults: the mediating role of materialism, J. Adolesc. 61 (2017) 117–130.

[66] D. Iacobucci, Structural equations modeling: fit indices, sample size, and advanced topics, J. Consum. Psychol. 20 (1) (2010) 90–98.

[67] A. Japutra, S. Molinillo, A.F. Utami, I.A. Ekaputra, Exploring the effect of relative advantage and challenge on customer engagement behavior with mobile commerce applications, Telematics Inf. (2022), 101841.

[68] J.J. Kim, H. Song, J. Choi, Y. Kim, J. Hong, Channel stickiness in the shopping journey for electronics: evidence from China and South Korea, J. Bus. Res. 130 (2021) 506–516.

[69] B.U. Khan, S. Wei, S.N.A. Shah, R. Gul, S. Ullah, S. Mehmood, Role of blogging in perceived learning and satisfaction of students, J. Publ. Aff. 21 (1) (2021) e2120.

[70] K. Kang, J. Lu, L. Guo, W. Li, The dynamic effect of interactivity on customer engagement behavior through tie strength: evidence from live streaming commerce platforms, Int. J. Inf. Manag. 56 (2021), 102251.

[71] H.S. Kim, M. Kim, Viewing sports online together? Psychological consequences on social live streaming service usage, Sport Manag. Rev. 23 (5) (2020) 869–882.

[72] S.W. Kühn, D.J. Petzer, Fostering purchase intentions toward online retailer websites in an emerging market: an SOR perspective, J. Internet Commer. 17 (3) (2018) 255–282.

[73] J. Kim, H. Song, Celebrity's self-disclosure on Twitter and parasocial relationships: a mediating role of social presence, Comput. Hum. Behav. 62 (2016) 570–577.

[74] R.B. Kline, Principles and Practice of Structural Equation Modeling, Guilford publications, 2015.

[75] M. Kang, M.A. Schuett, Determinants of sharing travel experiences in social media, J. Trav. Tourism Market. 30 (1–2) (2013) 93–107.

[76] J.H. Kim, M.S. Kim, Y. Nam, An analysis of self-construals, motivations, facebook use, and user satisfaction, Int. J. Hum. Comput. Interact. 26 (2010) 1077–1099, https://doi.org/10.1080/10447318.2010.516726.

[77] E. Katz, H. Haas, M. Gurevitch, On the use of the mass media for important things, Am. Socio. Rev. (1973) 164–181.

[78] J. Liao, K. Chen, J. Qi, J. Li, Y.Y. Irina, Creating immersive and parasocial live shopping experience for viewers: the role of streamers' interactional communication style, J. Res. Indian Med. (2022), https://doi.org/10.1108/JRIM-04-2021-0114.

[79] Y. Li, X. Li, J. Cai, How attachment affects user stickiness on live streaming platforms: a socio-technical approach perspective, J. Retailing Consum. Serv. 60 (2021), 102478.

[80] X. Liu, T. Oda, The impact of the Live streamer on Trust in China during COVID-19 pandemic, in: Proceedings of ISPIM Innovation Conference – Innovating Our Common Future. Event Proceedings, LUT Scientific and Expertise Publications, 2021,June, ISBN 978-952-335-467-8.

[81] C.H. Lee, C.W. Chen, Impulse buying behaviors in live streaming commerce based on the stimulus-organism-response framework, Information 12 (6) (2021) 241.

[82] G.H. Liu, M. Sun, N.C.A. Lee, How can live streamers enhance viewer engagement in eCommerce streaming?, in: Proceedings of the 54th Hawaii International Conference on System Sciences, 2021, January, p. 3079.

[83] B. Liu, M. Song, G. Yang, S. Cheng, M. Li, Stimulus Organism Response Model Based Analysis on Consumers' Online Impulse Buying Behavior, The International Journal of Electrical Engineering & Education, 2020, 0020720920940585.

[84] J.S. Lim, M.J. Choe, J. Zhang, G.Y. Noh, The role of wishful identification, emotional engagement, and parasocial relationships in repeated viewing of live-streaming games: a social cognitive theory perspective, Comput. Hum. Behav. 108 (2020), 106327.

[85] Q. Long, A.C. Tefertiller, China's new mania for live streaming: gender differences in motives and uses of social live streaming services, Int. J. Hum. Comput. Interact. 36 (14) (2020) 1314–1324.

[86] J. Lin, Z. Luo, X. Cheng, L. Li, Understanding the interplay of social commerce affordances and swift guanxi: an empirical study, Inf. Manag. 56 (2) (2019) 213–224.

[87] Y. Liu, X. Luo, Y. Cao, Investigating the influence of online interpersonal interaction on purchase intention based on stimulus-organism-reaction model, Hum. Centr. Comp. Inform. Sci. 8 (1) (2018) 1–15.

[88] Z. Lv, Y. Jin, J. Huang, How do sellers use live chat to influence consumer purchase decision in China? Electron. Commer. Res. Appl. 28 (2018) 102–113.

[89] C.H. Lien, Y. Cao, X. Zhou, Service quality, satisfaction, stickiness, and usage intentions: an exploratory evaluation in the context of WeChat services, Comput. Hum. Behav. 68 (2017) 403–410.

[90] C. Liao, P.L. To, Y.C. Wong, P. Palvia, M.D. Kakhki, The impact of presentation mode and product type on online impulse buying decisions, J. Electron. Commer. Res. 17 (2) (2016) 153.

[91] S.W. Lin, L.Y.S. Lo, Evoking online consumer impulse buying through virtual layout schemes, Behav. Inf. Technol. 35 (1) (2016) 38–56.

[92] H. Liu, H. Chu, Q. Huang, X. Chen, Enhancing the flow experience of consumers in China through interpersonal interaction in social commerce, Comput. Hum. Behav. 58 (2016) 306–314.

[93] L. Lin, P.J.-H. Hu, O.R.L. Sheng, J. Lee, Is stickiness profitable for electronic retailers, Commun. ACM 53 (2010) 132–136.

[94] J.C.C. Lin, Online stickiness: its antecedents and effect on purchasing intention, Behav. Inf. Technol. 26 (6) (2007) 507–516.

[95] Y. Liu, Developing a scale to measure the interactivity of websites, J. Advert. Res. 43 (2) (2003) 207–216.

[96] S.J. Lee, Perceptions of panethnicity among Asian American high school students, Amerasia J. 22 (2) (1996) 109–126.

[97] L. Ma, S. Gao, X. Zhang, How to use live streaming to improve consumer purchase intentions: evidence from China, Sustainability 14 (2) (2022) 1045.

[98] J. Ming, Z. Jianqiu, M. Bilal, U. Akram, M. Fan, How social presence influences impulse buying behavior in live streaming commerce? The role of SOR theory, Int. J. Web Inf. Syst. 17 (2021) 300–320.

[99] Y. Ma, To shop or not: understanding Chinese consumers' live-stream shopping intentions from the perspectives of uses and gratifications, perceived network size, perceptions of digital celebrities, and shopping orientations, Telematics Inf. 59 (2021), 101562.

[100] Y. Ma, Elucidating determinants of customer satisfaction with live-stream shopping: an extension of the information systems success model, Telematics Inf. 65 (2021), 101707.

[101] S. Molinillo, R. Aguilar-Illescas, R. Anaya-Sánchez, F. Liébana-Cabanillas, Social commerce website design, perceived value and loyalty behavior intentions: the moderating roles of gender, age and frequency of use, J. Retailing Consum. Serv. (2021), 102404.

[102] F.J. Martínez-López, R. Anaya-Sánchez, M. Fernández Giordano, D. Lopez-Lopez, Behind influencer marketing: key marketing decisions and their effects on followers' responses, J. Market. Manag. 36 (7–8) (2020) 579–607.

[103] A. Mehrabian, J.A. Russell, An Approach to Environmental Psychology, the MIT Press, 1974.

[104] S. Nandi, M.L. Nandi, V. Khandker, Impact of perceived interactivity and perceived value on mobile app stickiness: an emerging economy perspective, J. Consum. Market. 38 (6) (2021) 721–737.

[105] C. Nam, K. Cho, Y.D. Kim, Cross-cultural examination of apparel online purchase intention: SOR paradigm, J. Glob. Fash. Mark. (2020) 1–15.

[106] T.W. Ng, The incremental validity of organizational commitment, organizational trust, and organizational identification, J. Vocat. Behav. 88 (2015) 154–163.

[107] S. Nambisan, R.A. Baron, Virtual customer environments: testing a model of voluntary participation in value co-creation activities, J. Prod. Innovat. Manag. 26 (4) (2009) 388–406.

[108] D.A. Norman, Affordance, conventions, and design, Interactions 6 (3) (1999) 38–43.

[109] P.M. Podsakoff, S.B. MacKenzie, J.Y. Lee, N.P. Podsakoff, Common method biases in behavioral research: a critical review of the literature and recommended remedies, J. Appl. Psychol. 88 (5) (2003) 879.

[110] S.K. Roy, W.M. Lassar, G.T. Butaney, The mediating impact of stickiness and loyalty on word-of-mouth promotion of retail websites: a consumer perspective, Eur. J. Market. 48 (9–10) (2014) 1828–1849.

[111] P. Racherla, C. Furner, J. Babb, Conceptualizing the implications of mobile app usage and stickiness, Res. Agenda (2012). Available at: SSRN 2187056.

[112] M.T. Rivera, S.B. Soderstrom, B. Uzzi, Dynamics of dyads in social networks: assortative, relational, and proximity mechanisms, Annu. Rev. Sociol. 36 (2010) 91–115.

[113] F.F. Reichheld, P. Schefter, E-loyalty: your secret weapon on the web, Harv. Bus. Rev. 78 (4) (2000) 105–113.

[114] S. Singh, N. Singh, Z. Kalinić, F.J. Liébana-Cabanillas, Assessing determinants influencing continued use of live streaming services: an extended perceived value theory of streaming addiction, Expert Syst. Appl. (2021), 114241.

[115] S. Shavitt, A.J. Barnes, Culture and the consumer journey, J. Retailing 96 (1) (2020) 40–54.

[116] Z. Shao, L. Zhang, K. Chen, C. Zhang, Examining User Satisfaction and Stickiness in Social Networking Sites from a Technology Affordance Lens: Uncovering the Moderating Effect of User Experience, Industrial Management & Data Systems, 2020.

[117] Y. Sun, X. Shao, X. Li, Y. Guo, K. Nie, How live streaming influences purchase intentions in social commerce: an IT affordance perspective, Electron. Commer. Res. Appl. 37 (2019), 100886.

[118] M. Saghapour, M. Iranmanesh, S. Zailani, G.G.G. Goh, An empirical investigation of campus portal usage, Educ. Inf. Technol. 23 (2) (2018) 777–795.

[119] S.S. Sundar, H. Jia, T.F. Waddell, Y. Huang, Toward a theory of interactive media effects (TIME) four models for explaining how interface features affect user psychology, in: The Handbook of the Psychology of Communication Technology, 2015, pp. 47–86.

[120] D.H. Shin, Understanding e-book users: uses and gratification expectancy model, New Media Soc. 13 (2) (2011) 260–278.

[121] S.S. Sundar, The MAIN Model: A Heuristic Approach to Understanding Technology Effects on Credibility, MacArthur Foundation Digital Media and Learning Initiative, 2008, pp. 73–100.

[122] P.N. Shamdasani, A.A. Balakrishnan, Determinants of relationship quality and loyalty in personalized services, Asia Pac. J. Manag. 17 (3) (2000) 399–422.

[123] İ. Tuncer, The relationship between IT affordance, flow experience, trust, and social commerce intention: an exploration using the SOR paradigm, Technol. Soc. 65 (2021), 101567.

[124] M.S. Talukder, R. Chiong, Y. Bao, B.H. Malik, Acceptance and use predictors of fitness wearable technology and intention to recommend, Ind. Manag. Data Syst. 119 (1) (2019) 170–188.

[125] P.R. Todd, J. Melancon, Gender and live-streaming: source credibility and motivation, J. Res. Indian Med. 12 (1) (2018) 79–93.

[126] G.W.H. Tan, V.H. Lee, J.J. Hew, K.B. Ooi, L.W. Wong, The interactive mobile social media advertising: an imminent approach to advertise tourism products and services? Telematics Inf. 35 (8) (2018) 2270–2288.

[127] W.Y. Tsao, Enhancing competitive advantages: the contribution of mediator and moderator on stickiness in the LINE, J. Retailing Consum. Serv. 21 (6) (2014) 933–941.

[128] P.C. Verhoef, K.N. Lemon, A. Parasuraman, A. Roggeveen, M. Tsiros, L.A. Schlesinger, Customer experience creation: determinants, dynamics and management strategies, J. Retailing 85 (1) (2009) 31–41.

[129] L. Wu, M.L. Chiu, K.W. Chen, Defining the determinants of online impulse buying through a shopping process of integrating perceived risk, expectation-confirmation model, and flow theory issues, Int. J. Inf. Manag. 52 (2020), 102099.

[130] A. Wongkitrungrueng, N. Assarut, The role of live streaming in building consumer trust and engagement with social commerce sellers, J. Bus. Res. 117 (2020) 543–556.

[131] T. Wulf, F.M. Schneider, S. Beckert, Watching players: an exploration of media enjoyment on Twitch, Game. Cult. 15 (3) (2020) 328–346.

[132] H. Wang, Y. Meng, W. Wang, The role of perceived interactivity in virtual communities: building trust and increasing stickiness, Connect. Sci. 25 (1) (2013) 55–73.

[133] S.M. Wang, Exploring the factors influencing the usage intention of Facebook fan page–a preliminary study, in: Proceeding of 19th Americas Conference on Information Systems, 2, 2013, pp. 1595–1600, 2013.

[134] M. Wolfinbarger, M.C. Gilly, Shopping online for freedom, control, and fun, Calif. Manag. Rev. 43 (2) (2001) 34–55.

[135] J. Xu, H.S. Du, K.N. Shen, D. Zhang, How gamification drives consumer citizenship behaviour: the role of perceived gamification affordances, Int. J. Inf. Manag. 64 (2022), 102477.

[136] H. Xu, K.Z. Zhang, S.J. Zhao, A Dual Systems Model of Online Impulse Buying, Industrial Management & Data Systems, 2020.

[137] J. Xue, X. Liang, T. Xie, H. Wang, See now, act now: how to interact with customers to enhance social commerce engagement? Inf. Manag. 57 (6) (2020), 103324.

[138] X. Xu, J.H. Wu, Q. Li, What drives consumer shopping behavior in live streaming commerce? J. Electron. Commer. Res. 21 (3) (2020) 144–167.

[139] F. Xu, Y. Qi, X. Li, What affects the user stickiness of the mainstream media websites in China? Electron. Commer. Res. Appl. 29 (2018) 124–132.

[140] C.Y. Xu, S. Ryan, M. Magro, C. Wen, Why do people stick with a specific social networking site? An integrated relationship and uses gratification perspective, AMCIS 2012 Proceedings. 24, https://aisel.aisnet.org/amcis2012/proceedings/VirtualCommunities/24, 2012.

[141] T. Yang, F. Yang, J. Men, The Impact of Danmu Technological Features on Consumer Loyalty Intention toward Recommendation Vlogs: a Perspective from Social Presence and Immersion, Information Technology & People, 2021.

[142] Q. Yang, X. Gong, The Engagement–Addiction Dilemma: an Empirical Evaluation of Mobile User Interface and Mobile Game Affordance, Internet Research, 2021.

[143] M. Yin, S.M.U. Tayyab, X.Y. Xu, S.W. Jia, C.L. Wu, The investigation of mobile health stickiness: the role of social support in a sustainable health approach, Sustainability 13 (4) (2021) 1693.

[144] S. Yang, X. Zeng, Sustainability of government social media: a multi-analytic approach to predict citizens' mobile government microblog continuance, Sustainability 10 (12) (2018) 4849.

[145] J. Ylitalo, Controlling for Common Method Variance with Partial Least Squares Path Modeling: A Monte Carlo Study. Research Project, Helsinki University of Technology, 2009.

[146] M. Zhang, Y. Liu, Y. Wang, L. Zhao, How to retain customers: understanding the role of trust in live streaming commerce with a socio-technical perspective, Comput. Hum. Behav. 127 (2022), 107052.

[147] L. Zhu, H. Li, F.K. Wang, W. He, Z. Tian, How Online Reviews Affect Purchase Intention: a New Model Based on the Stimulus-Organism-Response (SOR) Framework, Aslib Journal of Information Management, 2020.

[148] M. Zhang, L. Sun, F. Qin, G.A. Wang, E-service quality on live streaming platforms: swift guanxi perspective, J. Serv. Market. 35 (3) (2020) 312–324.

[149] F. Zhou, L. Chen, Q. Su, Understanding the impact of social distance on users' broadcasting intention on live streaming platforms: a lens of the challenge-hindrance stress perspective, Telematics Inf. 41 (2019) 46–54.

[150] B. Zhu, S. Kowatthanakul, P. Satanasavapak, Generation Y Consumer Online Repurchase Intention in Bangkok: Based on Stimulus-Organism-Response (SOR) Model, International Journal of Retail & Distribution Management, 2019.

[151] H. Zhao, X. Cheng, X. Wang, C. Qin, Do Brand Micro-blogs Entities' Interactivity Enhance Customer's Brand Resonance? Evidence from China, Asian Business & Management, 2019, pp. 1–19.

[152] M. Zhang, L. Guo, M. Hu, W. Liu, Influence of customer engagement with company social networks on stickiness: mediating effect of customer value creation, Int. J. Inf. Manag. 37 (3) (2017) 229–240.

[153] H. Zhang, Y. Lu, S. Gupta, L. Zhao, What motivates customers to participate in social commerce? The impact of technological environments and virtual customer experiences, Inf. Manag. 51 (8) (2014) 1017–1030.