



# Customer satisfaction and intention to recommend among live-streaming shopping customers: An extension of the unified theory of acceptance and use of technology 2

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## Abstract

Live-streaming shopping has become an emerging pattern of online consumption in recent years, and China is the market with the most rapid development in live-streaming shopping. However, there are limitations of understanding customer psychological states towards live-streaming shopping. This study extended the unified theory of acceptance and use of technology-2 model along with the customer innovativeness to investigate customer satisfaction, intention to recommend, and usage behavior of live-streaming shopping. Moreover, the demographic factors of age, gender, and experience were included and considered moderating factors. A snowball sampling method was applied to collect data from 739 Chinese live-streaming consumers in mainland China. The findings of PLS-SEM analysis showed the proposed model has moderate power in explaining customer satisfaction ( $R^2 = .57$ ), usage behavior ( $R^2 = .48$ ), and the intention to recommend ( $R^2 = .46$ ). Besides, “habit” was the strongest mechanism of both customer satisfaction ( $\beta = .22$ ,  $p < .00$ ) and usage behavior ( $\beta = .40$ ,  $p < .00$ ). Ultimately, satisfaction was the most important predictor of customer intention to recommend a live-streaming shopping ( $\beta = .33$ ,  $p < .00$ ). The study provides empirical evidence that the unified theory of acceptance and use of technology-2 model can be extended to predict customer satisfaction in the context of online shopping. The results also provide meaningful practical insights that merchants can enhance customer satisfaction by forming their shopping habits via live-streaming patterns, thereby encouraging customers to recommend it.

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## Introduction

Technology advancements have made it possible for mobile devices to have a wide variety of additional features, which has shifted customers' behavior through e-commerce rather than in physical stores. Besides, physical businesses have been striving to acquire a strategic advantage by interacting with clients through e-commerce (Rita et al., 2019). Nowadays, most major e-commerce platforms across the world prioritize using live-streaming to increase sales (Fei et al., 2021). For instance, the number of transactions made on Mogujie, an e-commerce platform in China, utilizing mobile live streaming climbed by 138 percent from March 2018 to March 2019 (Liu et al., 2020). However, iiMedia Research (2022) reported that 24.3 percent of live-streaming users were very satisfied; 60.4 percent of them were satisfied, but there were still users who were not satisfied with live streaming.

The rapid growth of live-streaming shopping calls for more empirical studies, such as characteristics of live-streaming shopping (Zhang et al., 2021), customers intention (Zhou et al., 2021), and motivation (Cai et al., 2018) to shop via live-streaming platforms. However, studies on customer satisfaction with live-streaming shopping are still scarce. In addition, little research has explored the effect of customers intention to recommend shopping via live-streaming platforms. Untachai (2019) states that word-of-mouth has a significant commercial value. Consequently, it is critical to comprehend how to boost client satisfaction and promote recommendations in the context of live-streaming shopping.

Noteworthy, an online customer is both a shopper and a computer user (Koufaris, 2002). It indicates that shopping via a live-streaming platform is basically a type of human-computer interaction, thereby majorly applying the unified theory of acceptance and use of technology 2 (UTAUT2) introduced by Venkatesh et al. (2012). This study was designed to adapt UTAUT2 to investigate the internal factors of customers. In short, the objective of the current study is to propose an integrated model that forecasts customer satisfaction with live-streaming shopping and the intention to recommend it to others. The uniqueness of the study lies in following the directions of Venkatesh et al. (2016) to make a significant theoretical contribution by identifying new external variables. Another contribution is that it can be of great interest to stakeholders in e-commerce because they could improve the effectiveness of their selling channels according to the psychological motivation of customers.

## Literature Review

### *Live-Streaming Shopping*

In traditional e-commerce, consumers can access websites or mobile applications to browse graphical information or an introductory video, thereby placing an online order directly (Zhang et al., 2021). Particularly, mobile device-based sales and purchases of products and services via wireless networks are defined as "mobile commerce" (Chong, 2013). With the advancement of smartphones and 5G Internet, new patterns of online shopping have emerged. One pattern is social commerce, which is a new e-commerce delivery platform that has emerged on social networking sites (SNSs) and social media, such as Facebook (Cheng et al., 2019). The other pattern is called live-streaming shopping, which began in 2016 and grew quickly in 2018 and 2019 (Zhang et al., 2021). Chen (2021) identified five categories of live-streaming platforms in China, including comprehensive live-streaming platforms, standard live-streaming platforms, game live-streaming platforms, shopping live-streaming platforms, sports live-streaming platforms, and knowledge-sharing type live-streaming platforms. Shopping via live streaming is a novel kind of social media that involves significant human-computer interaction (Sun et al., 2019), as live streamers (vendors) utilize live video streaming as the primary medium for showcasing items and communicating with potential buyers (Zhang et al., 2021). Live-streaming shopping has modified the way in which retailers and marketers conduct e-commerce. It allows the vendor to demonstrate various elements of the goods, respond to viewers' inquiries in real-time, and integrate live advertising and entertainment activities throughout the entire buying experience (Zhang et al., 2021). Besides, live-streaming shopping is a platform with a low threshold of starting or participating (Wu & Chin, 2021). In other words, customers' usage of the internet and mobile phones enables them to engage in live-streaming shopping no matter where they are. To be concluded, the live-streaming shopping can be the integration of social media into traditional e-commerce websites like Taobao, as well as the integration of e-commerce functionality into third-party e-commerce on SNSs like Tiktok. The distinctiveness of live-streaming is that buyers can obtain auditory and visual information while also fulfilling their immediate interactions with vendors (Zhao & Bacao, 2021).

### Theoretical Model and Hypotheses Development

The UTAUT (Venkatesh et al., 2003) has been recognized as one of the most current and frequently utilized models of technology adoption (Wong et al., 2015). It utilizes four core exogenous mechanisms (performance expectancy, effort expectancy, social influence, and facilitating conditions) along with four moderators (voluntariness of use, experience, age and gender) to predict the usage and intention (Tak & Panwar, 2017). Venkatesh et al. (2012) presented the UTAUT2 by adding three more constructs (habit, price value, and hedonic motivation) to UTAUT to make it fit a customer use context. The UTAUT2 exhibits strong explanatory power when applied to e-commerce or online purchasing, such as online ticket purchasing for low-cost carriers (Escobar-Rodríguez & Carvajal-Trujillo, 2014), mobile banking (Çera et al. 2020), online hotel booking (Chang et al. 2019), purchase travel online (Sharma et al., 2021) and live-streaming shopping (Sun, 2022). In short, it has been demonstrated that UTAUT2 is a valuable theoretical framework for explaining customer behavior from an online buying standpoint. Satisfaction is a part of customer behavior, that is closely related to customer attitudes and intentions, and positively impacts customers' behavioral intentions (Rita et al., 2019). In the area of mobile technology and commerce, Kalinić et al. (2020) found the predictors of the technology acceptance model, UTAUT2, and the expectation-confirmation model have been chosen as the satisfaction predictors. Therefore, based on the recommendations of the UTAUT2 study (Venkatesh et al., 2016), the UTAUT2 model of this study is adapted within the context of a new endogenous variable, customer satisfaction, as well as additional factors of customer innovativeness and intention to recommend.

Performance expectancy is the measure of how much customers will gain from using live-streaming shopping platforms when they conduct online purchases (Venkatesh et al., 2012). In particular, live-streaming platforms deliver new information and goods in an appealing atmosphere of collective consumption (Zhang et al., 2021). Performance expectancy has thus been found to be a prime driver of customer satisfaction in mobile commerce (Marinkovic & Kalinic, 2017). Hence, H1 is presented:

H1: Performance expectancy positively influences customer satisfaction.

Effort expectancy is the level of difficulty perceived by users when using live-streaming shopping (Venkatesh et al., 2012). Live-streaming platforms can be embedded

in traditional e-commerce websites or mobile applications, allowing consumers to enter the live streams directly by clicking the icon to place an order while watching the live streams (Cai et al., 2018; Wang et al., 2022). Kalinić et al. (2020) confirmed that effort expectancy is a significant determinant of customer satisfaction in mobile commerce services. Therefore, H2 is proposed:

H2: The effort expectancy positively influences customer satisfaction.

Social influence refers to the influence of opinions from other significant individuals on the acceptance of new technology (Venkatesh et al., 2012). Individuals, in general, have the herd mentality and the convergence mentality, and as a result, they will subconsciously converge their behavior and beliefs with those of their family, friends, or coworkers. The significantly increased influence on customer satisfaction was verified in mobile commerce in Serbia (Marinković et al., 2020). Therefore, H3 is proposed:

H3: Social influence positively influences customer satisfaction.

Venkatesh et al. (2003) defined the facilitating conditions as the extent to which an individual perceives the support of related conditions while using the technology. Regarding the context of live-streaming shopping, facilitating conditions include network conditions, payment choices, and mobile devices (Zhou et al., 2021). In the context of live-streaming, it is crucial to get assistance from others when meeting difficulties. Customers benefit from the unique feature of real-time interactions between anchors and viewers in live-streaming platforms (Zhao & Bacao, 2021). Thus, the following hypotheses are proposed:

H4: Facilitating conditions positively influences customer satisfaction.

H5: Facilitating conditions positively impacts usage behavior.

Hedonic motivation is described as the enjoyment or playfulness gained from utilizing a particular technology, such as live-streaming shopping (Venkatesh et al., 2012). It has been confirmed to have a strong impact on customer satisfaction in various studies, such as those of e-commerce customers in Indonesia (Evelina et al., 2020) and US-based Airbnb users (Lee & Kim, 2018). According to earlier studies, H6 is presented:

H6: Hedonic motivation positively influences customer satisfaction.

Price value is the perceived balance between the expenses and advantages of utilizing a new system or technology (Zhou et al., 2021). Because the majority of live-streaming shopping offers discounts or promotions,

value-conscious users may be enticed to purchase through live-streaming rather than other platforms. The significant effect of price value on customer satisfaction was confirmed by Kalinić et al. (2020). Therefore, H7 is proposed:

H7: Price value positively influences customer satisfaction.

Habit is an automatically triggered behavior that people participate in without purposeful control or conscious awareness (Limayem et al., 2007). Ersche et al. (2017) termed favor order, familiarity and regularity as routine dimension of habit. Furthermore, when shopping becomes a routine, customers can save time and increase efficiency, thereby increasing their level of satisfaction. Therefore, the following hypotheses are proposed:

H8: Habit positively influences customer satisfaction.

H9: Habit positively impacts usage behavior.

Vandecasteele and Geuens (2010) categorized customer innovativeness as a subset of the global innate innovativeness concept, that indicates customers prefer to purchase new brands and items (Roehrich, 2004). Live-streaming shopping is a novel shopping channel, and customers with a high degree of innovativeness are more likely to adopt this consumption pattern. Sanny et al. (2019) found a significant effect on customer innovativeness toward customer satisfaction in Indonesia. Besides, Venkatesh et al. (2012) mentioned that such innovativeness can lead to an increase in hedonic motivation to use any product. Lastly, Feng (2018) confirmed the product's innovativeness can increase consumer word of mouth. Thus, hypotheses are presented:

H10: Customer innovativeness positively influences customer satisfaction.

H11: Customer innovativeness positively influences intention to recommend.

H12: Customer innovativeness positively influences hedonic motivation.

Customers' intention to recommend is a post-adoption behavior (Talukder et al., 2019). There is adequate evidence to support the relationship among online customer satisfaction and intention to recommend (Rita et al., 2019). Furthermore, Çera et al. (2020) discovered that actual usage behavior was a significant predictor of the intention to recommend. Lastly, previous studies also found customer satisfaction has a positive effect on actual usage behavior (Sharma & Sharma, 2019). Thus, hypotheses are proposed:

H13: Customer satisfaction positively influences usage behavior.

H14: Usage behavior positively influences intention to recommend.

H15: Customer satisfaction positively influences intention to recommend.

## Methodology

### Participants

The sample of consumers who had live-streaming shopping experiences was drawn from mainland China. One pre-screening question asked respondents if they had experience with live-streamed shopping in order to gauge the compatibility of potential respondents. The questionnaire was only accessible to individuals who indicated they had a specific experience. In particular, mainland China is a suitable place to collect this sample because China is recognized as the cradle of live commerce (Pasquali, 2022). In addition, there were 464 million live-streaming users as of December 2021 in China (Ma, 2022). Thus, Taro Yamane's statistical formula (Yamane, 1967) was applied to define the rounded sample size of 400 out of 464 million.

### Research Instruments

A self-administered survey was conducted to collect data, which involved two parts. The first part was demographic information involving age, gender, and shopping experience of live-streaming; the second part contained a 7-point Likert scale ranging from "1 = strongly disagree" to "7 = strongly agree" for measuring psychological factors of the respondents with forty-four items as the Appendix illustrated. The exogenous mechanisms of UTAUT2 were measured using the scale adapted from Zhou et al. (2021), Venkatesh et al. (2012), Çera et al. (2020), and Escobar-Rodríguez and Carvajal-Trujillo (2014), which contains thirty-one items. Customer satisfaction was measured using the scale adapted from Sharma and Sharma (2019), which has three items. Usage behavior was measured through a scale adapted from Zhou et al. (2021), which involves three items. Customer innovativeness was measured using the scale adapted from Escobar-Rodríguez & Carvajal-Trujillo (2014), which contains three items. Intention to recommend was measured using the scale adapted from Çera et al. (2020), which includes four items.

Since the population of this study was Chinese, a back-translation method (Behr, 2017) was applied to translate the questionnaire into that language. Besides, a pilot study was conducted to ensure the reliability and validity of the overall questionnaire and showed all constructs met the threshold.

## Data Collection

The ethical procedure of this study was approved by the Ethics Committee in Human Research, National Institute of Development Administration (reference no. ECNIDA 2022–0107). By the end of 24th August 2022, there were 390 infections of Covid-19 in mainland China (National Health Commission of the People's Republic of China, 2022); therefore, on-site data collection was difficult there. Besides, there was no list of live-streaming customers because of the privacy policies. Faugier and Sargeant (1997) have mentioned that snowball sampling methodology is the only feasible approach when sampling frames are not readily available. As a result, a snowball sampling method was used to collect data from Chinese users of live-streamed shopping. In addition, the online questionnaire (created on wjx.com) was used for data collection. By applying snowball sampling, the initial sample was first recruited from the author's personal connections in mainland China. They were then encouraged to share the link with their friends. The data were collected from August 24th to September 30th, 2022. In the end, 739 completed questionnaires were valid for data analysis. In this study, 254 (34.4%) men and 485 (65.6%) women out of 739 participants were surveyed. Additionally, 159 respondents (21.5%) were born after the year 2000, whereas 580 (78.5%) respondents were born in or before that year. Lastly, 166 (22.5%) respondents had experience with live-streaming shopping of less than a year, 364 (49.3%) had experience of 1–3 years, 167 (22.6%) had experience of 4–6 years, and 43 (5%), had experience of more than 7 years.

## Data Analysis

The proposed model of this study was assessed by utilizing partial least square structural equation modeling (PLS-SEM). Firstly, the proposed model contains 15 hypotheses and is considered a complex model. PLS-SEM allows for handling extremely complex models. Secondly, PLS-SEM is suitable for theory development and exploratory research as the proposed model of this study is an innovative model. Lastly, PLS-SEM is more suitable for testing the mediating and moderating effects. Therefore, SmartPLS (Ringle et al., 2015) was applied to examine this study.

## Results

### Measurement Model Analysis

All the requested criteria should be met before the structural model assessment (Hair et al., 2019). For measuring

the reliability and validity of the measurement model, the factor loadings, average variance extracted (AVE), discriminant validity composite reliability (CR), and Cronbach's alpha (CA) were used.

To begin, Table 1 demonstrates that factor loadings were measured to confirm the reliability of the indicators,

**Table 1** Construct reliability, validity, and factor loadings

Construct	CA	CR	AVE	Item	Loadings
PE	.94	.95	.84	PE1	.93
				PE2	.93
				PE3	.91
				PE4	.90
FC	.95	.96	.84	FC1	.97
				FC2	.92
				FC3	.92
				FC4	.92
				FC5	.85
EE	.92	.95	.81	EE1	.94
				EE2	.92
				EE3	.86
				EE4	.89
HM	.93	.95	.82	HM1	.95
				HM2	.91
				HM3	.88
				HM4	.89
INT	.93	.96	.88	INT1	.95
				INT2	.93
				INT3	.93
UB	.94	.96	.89	UB1	.95
				UB2	.94
				UB3	.95
IR	.96	.97	.89	IR1	.97
				IR2	.94
				IR3	.94
				IR4	.92
HA	.95	.96	.86	HA1	.96
				HA2	.90
				HA3	.94
				HA4	.91
PV	.95	.96	.84	PV1	.96
				PV2	.91
				PV3	.91
				PV4	.88
				PV5	.92
SA	.96	.97	.92	SA1	.97
				SA2	.95
				SA3	.95
SI	.94	.95	.80	SI1	.93
				SI2	.91
				SI3	.86
				SI4	.90
				SI5	.88

*Note:* PE = performance expectancy, EE = effort expectancy, SI = social influence, FC = facilitating conditions, HM = hedonic motivation, PV = price value, HA = habit, UB = use behavior, SA = customer satisfaction, INT = customer innovativeness, IR = intention to recommend.

with loadings exceeding .708 and being significant at the .05 level (Hair et al., 2019). Besides, cross-loadings were tested in the meantime, and the results showed that each indicator had a higher loading for its specified construct than for any of the other constructs (Urbach & Ahlemann, 2010). Following that, CA and CR were calculated to determine the constructs' internal consistency reliability, and the results revealed that all metrics were greater than the required threshold of .70 (Hair et al., 2019). Finally, all AVE values for convergent validity were greater than the standard threshold of .5 (Hair et al., 2019).

Because the Fornell-Larcker criterion (Fornell & Larcker, 1981) can overestimate the indicator loadings while underestimating the relationships of the structure model, the Heterotrait-Monotrait (HTMT) ratio of correlation was also used to test the discriminant validity as a higher boundary criterion (Henseler et al., 2014). According to Table 2, all HTMT ratios were less than the threshold of .85 (Hair et al., 2019), indicating that discriminant validity was adequate because all constructs were distinct from one another.

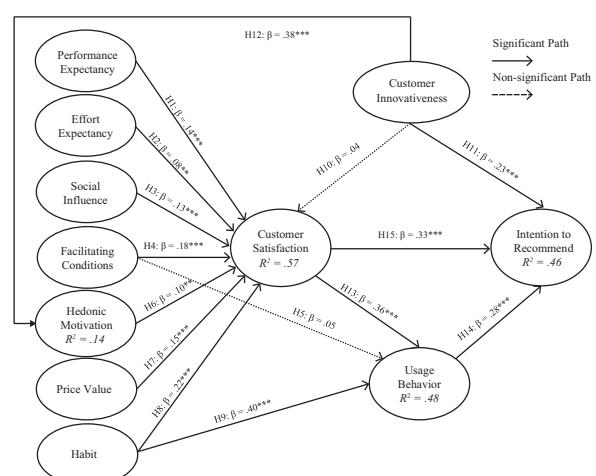
#### Common Method Bias (CMB) Assessment and Multicollinearity

Two methods were used to assess the CMB issue. First, Harman's one-factor method was applied by extracting a certain number of factors as one single component (Podsakoff et al., 2003). The total variance of 43.94 percent resulted in the unrotated principal components factor analysis, which indicates there is no CMB (Sun et al., 2019). Then, the second method applied a marker variable, which had no impact on the proposed model in this study, again verifying that there is no CMB (Venkatesh et al., 2012). In addition, the multicollinearity

was checked by the full variance inflation factor (VIF). The findings demonstrate there was no multicollinearity problem because the whole VIFs with latent variables varied from 1.00 to 1.94, which is lower than 3 (Hair et al., 2019).

#### Structural Model Analysis

To achieve a stable outcome, the PLS algorithm with 300 iterations and bootstrapping 5000 times was applied to test the path coefficients of the latent constructs and their significance accordingly (Hair et al., 2019). As Figure 1 illustrates, the significance of the path coefficient, the effect size ( $f^2$ ), the  $Q_2$ , and the  $R^2$  were measured. First, the effects of exogenous variables on customer satisfaction, hedonic motivation, usage behavior, and intention to recommend are tested. The findings show the



**Figure 1** The results of the structural model

Note: \*\* $p < .01$ , \*\*\* $p < .001$ .

**Table 2** Correlation of constructs

Constructs	EE	FC	HA	HM	INT	IR	PE	PV	SA	SI	UB
EE	.90										
FC	.52 (.55)	.92									
HA	.40 (.42)	.29 (.30)	.93								
HM	.41 (.44)	.33 (.34)	.47 (.50)	.91							
INT	.36 (.38)	.33 (.35)	.46 (.49)	.38 (.40)	.94						
IR	.44 (.47)	.40 (.42)	.58 (.61)	.46 (.49)	.48 (.50)	.94					
PE	.47 (.50)	.39 (.41)	.46 (.49)	.45 (.48)	.36 (.39)	.49 (.51)	.92				
PV	.41 (.44)	.44 (.46)	.48 (.50)	.42 (.45)	.37 (.39)	.52 (.54)	.47 (.50)	.92			
SA	.50 (.54)	.51 (.53)	.58 (.61)	.51 (.54)	.44 (.46)	.60 (.63)	.55 (.58)	.56 (.59)	.96		
SI	.44 (.47)	.40 (.42)	.57 (.61)	.52 (.56)	.46 (.49)	.55 (.58)	.51 (.54)	.48 (.51)	.58 (.61)	.90	
UB	.41 (.44)	.35 (.36)	.62 (.66)	.52 (.56)	.38 (.40)	.56 (.60)	.44 (.47)	.53 (.56)	.61 (.65)	.53 (.57)	.94

Note: PE = performance expectancy, EE = effort expectancy, SI = social influence, FC = facilitating conditions, HM = hedonic motivation, PV = price value, HA = habit, UB = use behavior, SA = customer satisfaction, INT = customer innovativeness, IR = intention to recommend; square root of AVE is presented in diagonal; value within bracket is the value of HTMT ratio.

model has moderate explanatory power on customer satisfaction ( $R^2 = .57$ ), usage behavior ( $R^2 = .48$ ), and intention to recommend ( $R^2 = .46$ ), along with a weak capacity to demonstrate hedonic motivation ( $R^2 = .14$ ). Then, the findings illustrate the predictive accuracy of the proposed model at a large level for customer satisfaction ( $Q^2 = .51$ ), a similarly large level for an intention to recommend ( $Q^2 = .41$ ) and usage behavior ( $Q^2 = .43$ ), and at a small extent for hedonic motivation ( $Q^2 = .11$ ). Finally, it can be inferred the following factors, in order of significance, are the key determinants of customer satisfaction: habit ( $\beta = .22, p < .00; f^2 = .06$ ), facilitating conditions ( $\beta = .18, p < .00; f^2 = .05$ ), price value ( $\beta = .15, p < .00; f^2 = .03$ ), performance expectation ( $\beta = .14, p < .00; f^2 = .03$ ) and social influence ( $\beta = .13, p < .00; f^2 = .05$ ). According to priorities, the main predictors of usage behavior are habit ( $\beta = .40, p < .00; f^2 = .20$ ), and customer satisfaction ( $\beta = .36, p < .00; f^2 = .19$ ). The main predictors of intention to recommend, in order of importance are: customer satisfaction ( $\beta = .33, p < .00; f^2 = .12$ ), usage behavior ( $\beta = .28, p < .00; f^2 = .09$ ), and customer's innovativeness ( $\beta = .23, p < .00; f^2 = .08$ ). Additionally, customer innovativeness has a significant effect on customer satisfaction ( $\beta = .38, p < .00; f^2 = .16$ ).

### Mediating and Moderating Effects

To more fully investigate the mediating effects among constructs in the theoretical framework, such mediating effects have been examined. Based on the regulations and procedures mentioned by Zhou et al. (2021), mediating effects were examined after bootstrapping (5000 times).

In short, total effects, indirect effects, and direct effects were used to explore the mediating effects among the constructs. Initially, an essential requirement for the meaningful presence of mediating effects is the significance of total effects and indirect effects. Besides, the mediator is considered a “full mediator” if the direct effects are not significant; otherwise, it is viewed as a “partial mediator”. Lastly, when the indirect and the direct effect are significant, the mediation is regarded as a “complementary mediation” if they point in the same direction; or it is considered as a “competitive mediation” if they point in opposite directions (Hair et al., 2021). **Table 3** presents that customer satisfaction has a full mediating effect between facilitating conditions and usage behavior, a complementary mediating effect between habit and usage behavior, but no mediating effect among customer innovativeness and intention to recommend. Moreover, hedonic motivation plays a full mediator role and usage behavior plays a complementary mediator role on their particular paths.

Venkatesh et al. (2016) emphasize that demographic characteristics have significant moderating effects on miscellaneous UTAUT frameworks. Therefore, a multigroup analysis in a PLS path modeling framework (Sarstedt et al., 2011) was utilized to validate the moderating effects on each path. As **Table 4** illustrates, gender has significant moderating effects on the paths from customer innovativeness to hedonic motivation (difference = -.246,  $p = .005$ ) and from customer innovativeness to intention to recommend (difference = -.176,  $p = .035$ ); experience has effects on the paths from habit to customer satisfaction (difference = .175,  $p = .029$ ) and habit to usage behavior (difference = .257,  $p = .003$ ).

**Table 3** Mediating Effects on the Structural Model Paths

Paths	Effects	Estimate	Bootstrap 5000 Times			Percentile 95%		Conclusion
			SE	T-statistics	p values	Low	Upper	
FC→SA→UB	Direct	.05	.04	1.38	.17	-.02	.13	Full mediation
	Indirect	.07***	.01	4.92	.00	.04	.09	
	Total	.12***	.04	3.16	.00	.04	.19	
HA→SA→UB	Direct	.40***	.04	9.57	.00	.31	.48	Complementary mediation
	Indirect	.08***	.02	5.09	.00	.05	.11	
	Total	.48***	.04	12.15	.00	.40	.55	
INT→SA→IR	Direct	.23***	.04	5.94	.00	.15	.30	No mediation
	Indirect	.01	.01	1.33	.18	-.01	.04	
	Total	.26***	.04	6.38	.00	.18	.34	
INT→HM→SA	Direct	.04	.03	1.34	.18	-.02	.11	Full mediation
	Indirect	.04*	.01	2.59	.01	.01	.07	
	Total	.08*	.04	2.31	.02	.01	.15	
SAT→UB→IR	Direct	.33***	.04	7.48	.00	.24	.41	Complementary mediation
	Indirect	.10***	.02	4.94	.00	.06	.14	
	Total	.43***	.04	11.16	.00	.35	.50	

Note: FC = facilitating conditions, HM = hedonic motivation, HA = habit, UB = use behavior, SA = customer satisfaction, INT = customer innovativeness, IR = intention to recommend.

\*\*\* $p < .001$ , \* $p < .05$  (bootstrapping with 5000 sub-samples and 2-tailed test).

**Table 4** Moderating effects of demographic factors

Path	Differences		
	Male - Female	p	1 to 3 years or less – 4 to 6 years or more
Customer innovativeness → Hedonic motivation	-.246**	.005	
Customer innovativeness → Intention to recommend	-.176*	.035	
Habit → Customer satisfaction			.175*
Habit → Usage behavior			.257**
			.029
			.003

Note: \*\*p < .01, \*p < .05. (Bootstrapping with 5000 sub-samples and 2-tailed test).

## Discussion

Based on the extended UTAUT2 framework, this study was proposed to investigate the impact mechanism of customer satisfaction and the intention to recommend using live-streaming shopping. Firstly, the findings confirm that the constructs of UTAUT2 significantly predict customer satisfaction, which is in line with previous studies (Kalinic et al., 2020; Marinković et al., 2020). The proposed model shows the moderate explanatory power on predicting customers satisfaction, intention to recommendation and usage behavior. This result adds the evidence to prior research, that the original UTAUT2 can be expanded with new outcome mechanisms of behavioral intention and technology use (Venkatesh et al., 2016).

Secondly, habit has been found to be the strongest predictor of usage behavior among the exogenous mechanisms of UTAUT2. This is in line with the study of Escobar-Rodríguez and Carvajal-Trujillo (2014) and Zhou et al. (2021), which found customer's habit can increase their usage of a technology. In addition, habit has also been found as the most influential factor towards customers satisfaction. This result fills the gaps of prior research (Kalinic et al., 2020; Marinković et al., 2020), which indicated that customers' habit is a key factor in customers experiencing satisfaction with live-streaming shopping. This may be because the real-time interaction of live-streaming shopping can answer customers' questions or clear up confusion related to the products or services in time, thereby improving shopping efficiency.

In addition, this study tried to explore the determinants of customer intention to recommend, or WOM. The findings were consistent with the previous studies, which found WOM can be significantly and positively predicted by customer innovativeness (Feng, 2018), customer satisfaction (Kalinic et al., 2020; Rita et al., 2019), and usage behavior (Çera et al., 2020). Ultimately, customer satisfaction has the strongest effect on the intention to recommend in this study. However, the relationship

between customer innovativeness and customer satisfaction was not significant, which is converse to a study by Sanny et al. (2019) on online transportation in Indonesia. Interestingly, hedonic motivation fully mediated the relationship between customer innovativeness and customer satisfaction. This finding adds evidence to the study by Venkatesh et al. (2012), that mentioned innovativeness may improve consumers' hedonic motivation to utilize any given product. The reason might be that live-streaming shopping has been developed maturely, customers will be satisfied when there is enjoyment or playfulness.

More importantly, this study found that customer satisfaction fully mediated between facilitating conditions and usage behavior. This finding is different with previous studies, which found that behavioral intention played a partial mediating role among facilitating conditions and usage behaviors (Escobar-Rodríguez & Carvajal-Trujillo, 2014; Tak & Panwar, 2017; Zhou et al., 2021). It means that even though the facilitating conditions are well supported, customers will not go shopping through a live-streaming platform unless they perceive satisfaction. As a result, live-streaming merchants should be concerned about customer satisfaction because it is a post-consumption that leads to a willingness to share information. For instance, in order to obtain customers' opinions, merchants can send a link containing a survey to customers after they confirm receiving the products or services.

Lastly, this study investigated the moderating role of individuals' demographic variables on customer satisfaction. The results show that female consumers tend to have a higher degree of innovativeness than male consumers, based on hedonic motivation and the intention to recommend. Furthermore, customers with less live-streaming shopping experience were more easily influenced by habit in terms of customer satisfaction and usage behavior. However, this study did not find a significant moderating role for age. That may be because of the rapid development of the Internet and mobile devices in China. No matter how old the individuals are, they have to use mobile phones and the Internet.

## Theoretical Contributions and Implications

This study has provided innovative explanations for consumer behavior and attitudes about live-streaming shopping. Two theoretical implications are provided by this research. On one hand, this study contributes to theoretical development by extending the UTAUT2 with new endogenous mechanisms, customer satisfaction and intention to recommend. It also fills the gaps of existing literature by dealing with attitudinal factors of customers toward the online shopping context. The findings show that the UTAUT2 model can effectively explain not only the motivation of consumers but also their attitude toward a new technology or system. Besides, the proposed model was validated in this research to encourage the understanding of employing the UTAUT2 model in the live-streaming shopping context. On the other hand, to the researcher's knowledge, this study was the initial research to investigate the moderating role of individuals' demographic variables—gender, experience, and age—on customer satisfaction based on the extension of the UTAUT2 model. Comparing the impacts of different moderators on each path brings a deeper understanding of the implications of consumer demographics on live-streaming shopping adoption.

## Implications for Practice

The major results of this study also demonstrate practical implications for live-streaming merchants, and live-streaming platform providers. This study helps stakeholders relevant to live-streaming shopping in understanding the attitudes and behaviors of various customer demographics impacted by the moderators of gender and experience. Particularly, customer innovativeness had the significant differences in male and female groups, which provides insights for live-streaming stakeholders to encourage female customers through novel products or services. In addition, customers' habit has been found as not only the significant differences in users with experience of varying lengths, but also as a critical factor to increase their usage habit and satisfaction. It indicates that the customers in mainland China can then be seen as habitual users, and they will continually use and feel satisfied with their familiar shopping channel. Therefore, live-streaming merchants should attract customers by using some promotion, for instance, "live-streaming only" discount.

## Limitations and Future Research Direction

Despite the contributions that the current study provides, there are several limitations. Firstly, cross-sectional data collection was applied, which limits the explanation of the patterns of a construct over time. Future research may permit longitudinal data collection to interpret the findings in terms of causality. Secondly, the snowball sampling method was used to collect data due to the period of the pandemic, which restricts the generalization of this study. Future research may apply a probability sampling method. Next, this research only considered Chinese users who live in mainland China; thus, future research may consider users who live in other countries in order to have a potential comparison in terms of culture and infrastructure. Lastly, as the development of live-streaming shopping in China, gamified functions have been embedded in the purchasing process. Further studies are encouraged to consider gamification with live-streaming shopping.

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## Conclusion

In summary, this research provides empirical evidence that the UTAUT2 model can be extended to explain customer satisfaction and intention to recommend in the online shopping context. Overall, the findings of this study have strengthened a comprehensive model for understanding Chinese customer satisfaction and intention to recommend using a live-streaming shopping. Furthermore, this study reinforced the idea that customer satisfaction is an important factor in influencing customers to recommend a product or service to others. This study also filled a gap in the existing literature by initially measuring the moderating effects of age, gender and experience on the determinants of customer satisfaction among the live-streaming shopping. Lastly, as an increasing number of users have begun to shop through a live-streaming platform, it is vital for live-streaming merchants and platform providers to understand the attitude and behaviors of customers, in order to assist them to survive in the dynamic e-commerce context.

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## Conflict of Interest

The author declares that there is no conflict of interest.

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## Appendix

PE1: The live streaming shopping saves me time for shopping.

PE2: Using live streaming platform would enhance my effectiveness of shopping.

PE3: Using live streaming platform would help me to choose the suitable commodity.

PE4: Using live streaming platform increases my chances of achieving commodities that are important to me.

EE1: It is easy for me to shop on the live streaming platform.

EE2: My interaction with live streaming shopping is clear and understandable.

EE3: It will take a short time for me to pick and pay on live streaming shopping.

EE4: It is easy for me to become skillful at using live streaming shopping.

SI1: My family and/or my friends suggested that I should choose live streaming shopping.

SI2: My colleagues and/or supervisors suggested that I should use live streaming shopping.

SI3: If my favorite celebrity becomes the anchor, then I will choose live streaming shopping.

SI4: People whose opinions I value prefer that I use live streaming shopping.

SI5: I do shopping through live streaming platform because many people are doing so.

FC1: I have mobile devices for shopping on live streaming platform.

FC2: Payment in live streaming platform is compatible with existing channels (such as Alipay, WeChat payment).

FC3: Internet speed is good for shopping on live streaming platforms.

FC4: I have the knowledge necessary to use live streaming shopping.

FC5: I can get help from others when I have difficulties using live streaming shopping.

HM1: Live streaming shopping is interesting because I can interact with the anchor.

HM2: Live streaming shopping is fun because I enjoy the shopping process.

HM3: Live streaming shopping is enjoyable, as the products are cost-effective.

HM4: I use live streaming shopping to keep up with the trends.

PV1: Goods on the live streaming platform are reasonably priced.

PV2: Goods on the live streaming platform are good value for the money.

PV3: At the current price, live streaming platform provides more commodity value.

PV4: I can save money by examining the prices on different live streaming platforms.

PV5: Live streaming shopping offers better value for my money.

HA1: The use of live streaming shopping has become a habit for me.

HA2: I am addicted to using live streaming shopping.

HA3: I use live streaming shopping frequently.

HA4: Using live streaming shopping has become natural to me.

INT1: If I heard about a new information technology, I would look for ways to experiment with it.

INT2: Among my peers, I am usually the first to explore new information technologies.

INT3: I like to experiment with new information technologies.

IR1: I will recommend to my friends to use the live streaming shopping.

IR2: I will recommend to my relatives to use the live streaming shopping.

IR3: I intend to recommend to my co-workers to use the live streaming shopping.

IR4: I intend to offer help to those I have recommended to use live streaming shopping.

UB1: Live streaming shopping is my first choice when I need to buy some things.

UB2: I will follow the anchor of the live streaming platform.

UB3: I will always use live streaming shopping in my daily life.

SA1: I am satisfied that live streaming shopping meets my requirements.

SA2: I am satisfied with live streaming shopping effectiveness.

SA3: I am satisfied with live streaming shopping efficiency.