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Understanding the self-perceived customer experience and repurchase intention in live streaming shopping: evidence from China

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As an increasingly mature way of shopping in China, live streaming shopping still faces the problems of high return rates and low repurchase rates. Based on the expectation confirmation theory, this study uses structural equation modeling (SEM) to explore the repurchase intention of live streaming shopping(LSS)users. The results show that perceived interactivity, perceived quality and perceived value have a direct and significant effect on confirmation and customer satisfaction. Perceived discounts do not directly improve user satisfaction; they must pass through a complete intermediary variable of confirmation. In addition, we also verified that the degree of confirmation affects satisfaction, and satisfaction has an impact on repurchase intention. Finally, our model tested gender factors as a control variable and found that gender differences significantly impact consumers' repurchase intentions. Considering these findings, we provide practical suggestions for retaining users and hopefully promoting the long-term development of live streaming shopping.

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Introduction

The development of 5 G technology not only improves infrastructure, such as network speed, but also makes daily life more intelligent and networked, and many new forms of business have emerged. Live e-commerce, a new method of social e-commerce that combines anchors and content, has developed in this context (Luo et al., 2021). During the COVID-19 pandemic, people's spending habits have gradually shifted from offline to online. The 52st Statistical Report on the Development Status of the Internet in China released by the China Internet Network Information Center (CNNIC) shows that in June 2023, the total number of live streaming users reached a remarkable 765 million, demonstrating an increase of 14.74 million compared to December 2022. Notably, live streaming shopping(LSS) users accounted for a staggering 526 million, constituting 48.8% of total Internet users. While the rapid surge in LSS users is impressive, certain specific data has raised concerns about its growth trajectory. According to Fig. 1, a mere 0.7% of users seldom returned or canceled orders, while the percentage of frequently returned, exchanged, or canceled orders soared to 47.4%. Additionally, Fig. 2 illustrates that in 2020, almost half of China's live streaming e-commerce users returned their purchases at least once a week on average. The presence of contradictory data suggests that there is still significant room for optimization in the user experience of LSS. Prioritizing the enhancement of user experience and fostering repurchase intention is crucial for the maturation and long-term development of the LSS business model.

LSS distinguishes itself from traditional online shopping in several aspects. Firstly, in LSS, the user's attention has shifted from the products they previously desired to the live streamers (Chen and Yang, 2023). The user's attention to the streamers of LSS platforms appears primarily driven by hedonistic motivations. Furthermore, the changing priorities of consumers have led manufacturers to depend on LSS platforms (such as TikTok) increasingly and streamers. Zhang and Tang (2023) give suggestions on whether to open LSS channels for manufacturers based on commission rate, fixed cost, and number of followers. Secondly, the real-time interaction between consumers and live streamers, as well as among consumers, is frequent and creates a new stage for product-oriented traditional e-commerce shopping (Scheibe et al., 2016). Traditional web shoppers can only get

information through images and text (Wongkitrungrueng and Assarut, 2020). LSS incorporates advanced streaming commerce technologies, such as bullet-screen and real-time video, to add social attributes and improve the shopping experience of users (Wongkitrungrueng and Assarut, 2020; Xu et al., 2020). Lastly, to attract consumers, live streamers often claim to provide the most favorable prices and guaranteed after-sales service (Laosuraphon and Nuangjamnong, 2022). Low-priced products can be highly tempting to users, and the attractiveness of the price positively influences the purchase intention of live shopping streaming users. However, when the price of a product is lower than that of its competitors, customers may perceive it as inferior or unreliable (Laosuraphon and Nuangjamnong, 2022). Chandrruangphen et al. (2022) research on fashion clothing also found that product quality will significantly affect users trust in live shopping sellers. Overall, LSS provides a special shopping experience for users (see Fig. 3). Hence, a study on the influence of LSS users' self-perception after utilizing LSS on their attitudes and behaviors, particularly regarding satisfaction and repurchase intention, holds significant value.

Purchase intention is the focus of previous research on LSS users. LSS, as a visual interactive social e-commerce, has a strong relationship between watch intention and purchase intention (Ho et al., 2022). The affordability of information technology (IT) significantly impacts user engagement (Sun et al., 2019). The quality of interaction(responsiveness, professionalism, information and personalization) is essential in stimulating consumers' emotions and driving them to impulsive shopping (Li et al., 2022). When selling luxury goods in a live broadcast, the perceived goods of users affect their engagement and purchase intention (Yu and Zheng, 2022). In addition, Zhang et al. (2023) proved that playing music during the buying phase is more effective than playing music continually in generating purchase intention and consumer memory. Previous studies have emphasized how LSS design features and marketing strategies induce users ' shopping tendencies. However, it should be noted that the maturity of the LSS model and the platform merchants' success depend on users' massive repurchase behavior. The reality is that the high return rate and the negative news (such as false streaming propaganda) of some head streamers have added too much uncertainty to the prospect of LSS. The experience perception of LSS users seems to be ignored by both practice and academics. Therefore, the purpose of this study is to explore whether LSS users ' current perception of consumer experience is consistent with their initial expectations. By subdividing self-perceived, we try to develop a framework that explains the repurchase intention of LSS users. This framework will enable us
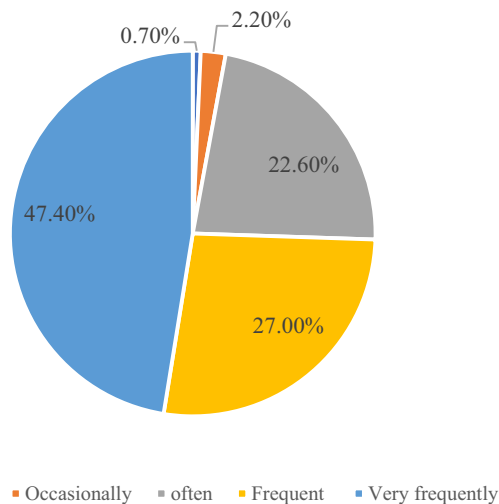
Fig. 1 LSS users' post-purchase behavior. The figure illustrates the quantity of orders canceled or returned by China's live e-commerce consumers in 2019. (Source: https://data.iimedia.cn/).
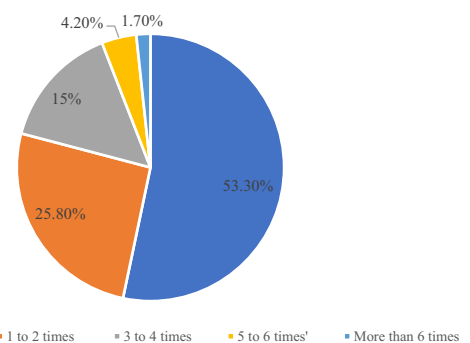
Fig. 2 LSS users' post-purchase behavior. The figure shows the average number of weekly returns by China's live e-commerce users in 2020. (Source: https://data.iimedia.cn/).
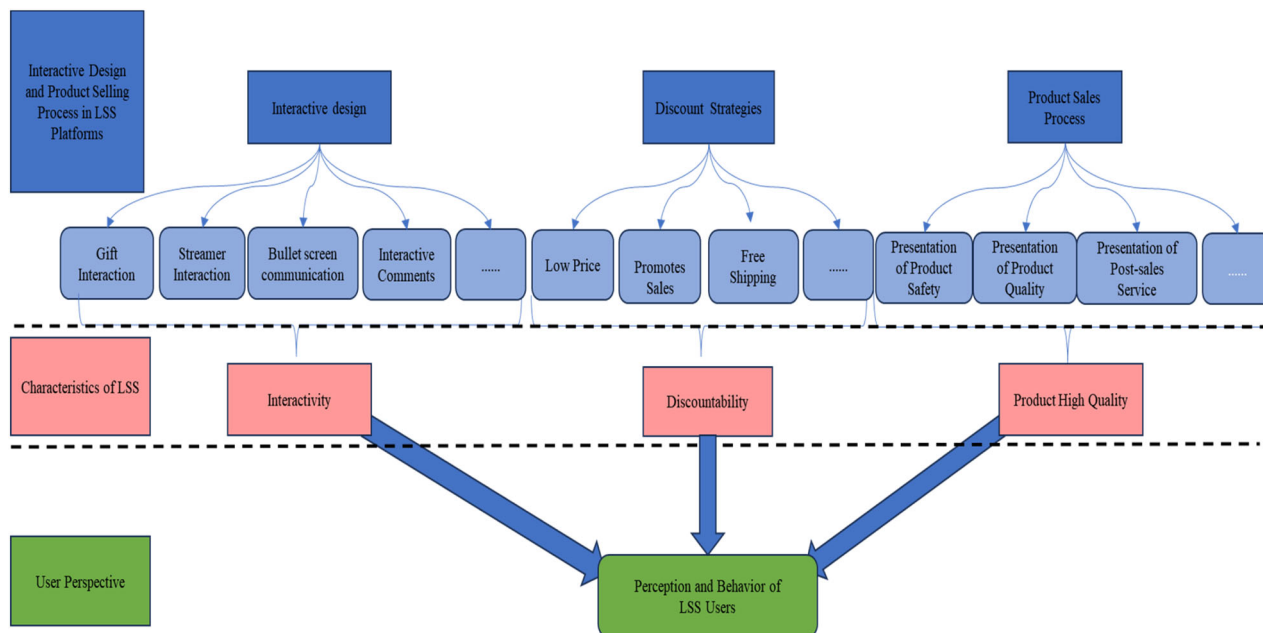
Fig. 3 Compilation of LSS Attributes. This figure reveals the unique shopping experience provided for users by the interactivity, discounting, and product high quality of LSS.

to gain a deeper understanding of user behavior in the post-purchase stage. Additionally, we hope the research findings can offer valuable insights and references for participants within the LSS context.

The remaining chapters of this article are as follows: In the second part, we provide a detailed literature review on the theory of reasoned action and expectation confirmation theory. In the third part, based on the previous literature, we define the related concepts, propose the research hypotheses and construct the model to examine our research problem. In the next part, we analyze and show the data results of the questionnaire survey. The fifth part is discussions and implications. In the last part, we list the limitations of our research and offer follow-up prospects in this field.

Literature review

Theory of reasoned action (TRA). Purchase intention and repurchase intention belong to different stages of pre-purchase and post-purchase, but both belong to the category of consumer behavior. Fishbein and Ajzen (1977) first proposed the theory of reasoned action to analyze the relationship between attitudes, intentions, and behaviors. Currently, some papers are based on the TRA to study purchase intention. Gundala et al. (2022) used the theory of reasoned action to investigate consumers' attitudes and intentions to purchase organic food. Lau et al. (2023) developed models integrating TRA, identity theory, and other theories to examine the impact of young consumers' attitudes toward luxury goods on their purchase intention. According to TRA, we learned that a person's decision is determined by his/her behavioral intention, which is influenced by the individual's attitude towards the behavior and subjective norms from society. Thus, TRA possesses a strong capability to clarify the intention to purchase.

The basis of TRA is that humans are rational decision-makers who can effectively and systemly use the information they acquire. Past behavior has also been shown to affect repurchase intention (Isaid and Faisal, 2015). Hellier et al. (2003) defined repurchase intention as a judgment on whether to buy goods or
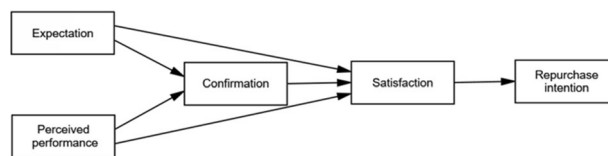

Fig. 4 Expectation-confirmation theory model. This model was widely used to study user satisfaction and continuous behavior.

services from the same company again based on personal circumstances. The perception of previous consumption experiences (e.g., perceived product quality, perceived price, etc.) is an integral component of our overall consumer experience. In the shopping process, whether online or offline, the user's experience significantly affects or even determines their satisfaction and repeated purchase intention (Cha and Lee, 2021).

Expectation-confirmation theory (ECT). (Oliver, 1980) proposed the expectation confirmation theory(ECT) to study user satisfaction and continuous behavior. The ECT shows that consumers determine the degree to which their expectations are confirmed by comparing perceived performance with pre-purchase expectations, thus forming their satisfaction with the products/services and, accordingly, their repurchase intention (see Fig. 4). With the ECT, customer satisfaction is conceptualized as a function of expectation and expectancy confirmation/disconfirmation (Liao et al., 2017).

ECT continues to be widely employed in numerous studies to explain and predict repeat purchase intention(behavior). Pradana (2022) studied E-commerce users' repurchase intention based on the service quality perspective and expectation confirmation theory. Ashfaq et al. (2019) examined the relationship among customer expectation, perceived enjoyment, perceived ease of use, satisfaction and repurchase intention of online second-hand products through the expectation-confirmation model. With the development of information technology, (Bhattacherjee, 2001) proposed the expectation confirmation model(ECM) to explain the continuous

Table 1 Summary of studies based on TRA and ECT.

Author(s)	The main aim of the study	Data Source and Method	Theory	Main Findings
(Lau et al., 2023)	To explore the attitudes of young consumers towards purchasing luxury fashion using partial least squares structural equation modeling (PLS-SEM).	Data source: Survey (237 young consumers of luxury fashion in Hong Kong) Method: PLS-SEM	TRA, Social identity theory, and the Affect-behavior-cognition (ABC) model.	Affect- and cognition-based attitudes were identified as antecedents that bolstered brand appeal, consequently exerting a positive impact on purchase intentions.
(Rausch and Kopplin, 2021)	This study seeks to identify the primary determinants of sustainable clothing purchase behavior and to illuminate the gap between purchase intentions and actual purchasing behavior of sustainable clothing.	Data source: Survey (464 available data) Method: PLS-SEM	TRA and Theory of planned behavior (TPB)	The attitude towards sustainable clothing exerts the most significant influence on purchase intention. However, this relationship is adversely affected by consumers' concerns about greenwashing. Additionally, consumers' perceived aesthetic risk harms the intention-behavior relationship, while perceived economic risk does not significantly affect this relationship.
(Nguyen et al., 2020)	Investigating the various factors influencing consumer attitudes and intentions towards purchasing functional foods in an emerging market economy.	Data source: Survey (596 available data from Vietnamese) Method: SEM	TRA	Health consciousness and subjective norms play a significant role in strengthening consumers' attitudes toward buying functional yogurts, with the perceived price of functional yogurts negatively affecting these attitudes. Additionally, subjective norms and attitudes are important predictors of consumers' intentions to purchase functional yogurt.
(Chatterjee et al., 2022)	Exploring the influence of online customer reviews and electronic word-of-mouth (eWOM) on customers' intent to purchase.	Data source: Survey (There are a total of 585 valid responses, with 305 from India and 280 from the United Kingdom.) Method: PLS-SEM	Socialization theory, TRA, Congruity theory and Expectation value theory (EVT)	In both the United Kingdom and India, eWOM and online customer reviews play a pivotal role in shaping purchase intentions. Notably, gender has no discernible impact on purchase intentions for UK consumers, while age and gender significantly influence the purchasing decisions of consumers in India.
(Wu et al., 2020)	Investigating the factors influencing the formation of impulsive consumer behavior.	Data source: Survey (352 available data) Method: PLS-SEM	ECM and the Flow theory	The perceived risk of virtual stores, the design of online stores and the psychological state of online shopping are closely related to online impulse shopping.
(Tata et al., 2021)	Investigate how the characteristics and confirmation from six e-retailers impact shoppers' satisfaction or regret and further explore the influence of these cognitive constructs on post-purchase behavior.	Data source: Survey (367 available data) Method: SEM	ECM and the Regret theory	The influence of product features on satisfaction, in comparison to factors like price and service, is not consistently significant. Furthermore, satisfaction and regret commonly demonstrate contrasting effects in the majority of post-purchase behaviors.
(Du et al., 2022)	The study explores the influence of information system quality characteristics and brand-related factors on consumers' intention to repurchase knowledge services.	Data source: Survey (301 available data from China) Method: PLS-SEM	Information systems success model, Social identity theory, and ECT	The success factors of the information system positively influence user satisfaction, and both user satisfaction and switching barriers contribute positively to the repurchase intention for online knowledge services.
(Istijanto et al., 2023)	Investigate the impact of new product attribute features on user satisfaction and purchase intention (taking Cookies enriched with spirulina as an example).	Data source: Survey (316 available data from Jakarta, the capital city of Indonesia) Method: SEM	Stimulus-Organism-Response (S-O-R) theory and ECT	The data results indicate that the thickness and texture of the new product did not significantly affect consumer satisfaction. However, all other features were confirmed by the data. Furthermore, an increase in consumer satisfaction with the product is associated with a corresponding rise in their purchase intentions.
(Shiau et al., 2020)	Investigate users' intentions for continued use of financial technology from the perspectives of their self-efficacy and experience.	Data source: Survey (753 available data) Method: PLS-SEM	Expectation confirmation theory of IS continuance and the theory of Self-efficacy	The utilization of self-efficacy and the ECT-IS theory provides a robust explanation for fintech continuance intentions. Furthermore, confirmation acts as a mediator variable between self-efficacy and perceived usefulness.

behavior of information system users, and subsequently, this theory was widely accepted. Choi et al. (2021) used this theory to explain mobile short video users' habit formation. Similarly, Chen et al. (2021) researched the users of credit-based internet finance platforms in China and found that ECM theory can explain those users' continuous usage behavior. In addition, we have compiled other studies related to the TRA and ECT in Table 1.

Our literature review found that ECT concentrates on the post-purchase evaluation phase of the consumer, while ECM is utilized more for determining users' willingness to continue using the information system. However, we should highlight that although consumers engage in LSS via mobile applications, which differs from conventional offline shopping, it still belongs to consumer behavior. In addition, there is a shortage of research on the

likelihood of consumers making repeat purchases in the LSS context. Consequently, this paper employs ECT, not ECM, to explore the variables that impact LSS users' repurchase intentions.

Research hypotheses

Confirmation(CO), Satisfaction(SA) and Repurchase intention(RE). Offline repurchase intention refers to an individual's decision to make a subsequent purchase of a specific product or service from the same company, taking into account their current circumstances and potential future situations. Online shopping distinguishes itself from traditional in-store shopping. Online repurchase intention reflects the consumer's reported likelihood of engaging in future repurchase behavior (Seiders et al., 2005). In this paper, LSS users will judge the possibility of repurchasing through live streaming based on their previous shopping experience. Many factors affect repurchase intention, but satisfaction is considered the most powerful explanation for repurchase intention (Kim et al., 2009). Massive researchers have proven the positive relationship between satisfaction and repurchase intention. Huarng and Yu (2019) examine consumer behavior in hotel stores within the network-sharing economy. They compare variables between online and traditional hotels and discover that satisfaction positively influences repurchase intention in both types of hotels. Chen et al. (2020) also verified that in the scenario of live streaming e-commerce, consumers' satisfaction has a positive impact on buyback intention through empirical analysis. Slimily, Antwi (2021) explores the impact of customer trust and satisfaction on repurchase intention in e-retail. Based on these findings, the following hypothesis is put forward:

H1. Satisfaction has a positive effect on LSS users'repurchase intention.

The satisfaction of LSS users is an internal response indicator after post-purchase. It reflects the outcome of users' assessment, and they compare their perceptions of LSS performance with their initial expectations. When consumers ' actual experience of shopping through the live streaming room meets or exceeds expectations, positive confirmation will bring higher satisfaction; on the contrary, dis-confirmation may reduce user satisfaction and may lead LSS users to abandon using this shopping way. The relationship between confirmation and satisfaction has been extensively studied in marketing literature. Nam et al. (2020) examined factors influencing electronic word-of-mouth and verified a positive correlation between online expectation confirmation and satisfaction via the ECT framework. Geraldine and Laurent (2019) developed a model focusing on repurchase intention in online household equipment purchases and found that consumer confirmation had a greater impact on satisfaction compared to perceived usefulness. Furthermore, the strong relationship between confirmation and satisfaction can also be observed in the continuous use of information systems. Daneji et al. (2019) discovered that confirmation significantly influenced students' satisfaction while exploring factors affecting their continued use of MOOCs. Thus, the following hypothesis is proposed:

H2. Confirmation has a positive effect on users'satisfaction.

Relationship between perceived interactivity(PI), satisfaction and confirmation. Perceived interactivity is defined as the degree to which users perceive their interpersonal interaction experience; it is a subjective feeling (Thong et al., 2006). Wang et al. (2022) pointed out that in live streaming, consumers can interact with streamers on issues related to commodities and exchange information with each other. A diversified interactive design excites(such as comments, gifts, likes, and forwarding) consumers

during the LSS process, creating a frenzied shopping atmosphere that makes people gradually lose self-control. In the context of online, Xiang and Chae (2022) classified social interactivity into three categories: playfulness, connectedness, and responsiveness, and verified that these three variables have a significant indirect effect on the willingness to continue using the video-sharing platform through satisfaction. Sihao et al. (2020) also explored how perceived interactivity has a significant impact on students' satisfaction with online education live broadcast platforms. Similarly, the better the subjective feeling of LSS users about the interactive experience during the shopping process, the higher their satisfaction will be, so we propose the following hypothesis:

H3. Perceived interactivity is positively associated with LSS users'satisfaction.

The vivid and interactive product presentation of LSS not only attracts a larger customer base but also facilitates their immersion in the shopping experience (Joo and Yang, 2023). When users engage in interactive shopping through a live streaming room, their perception of the interactivity of that shopping method (quick response from the streamers, real-time communication from other users) is more likely to exceed their expectations, which leads to a positive confirmation of LSS. Therefore, we further hypothesize:

H4. Perceived interactivity is positively related to confirmation.

Relationship between perceived quality(PQ), satisfaction and confirmation. The rules specified by experts, associations or instruments designed to measure the quality of goods are objective. However, perceived product quality is a subjective feeling influenced by internal and external factors. Internal factors include demographic differences such as gender and age, as well as cognitive and emotional factors. On the other hand, external factors that impact the perception of product quality are derived from various sources, such as marketing advertisements, recommendations from friends, word-of-mouth information about products and so on (Suhud et al., 2022). In previous research, it was found that the quality of the product affects brand awareness (Mahaputra and Saputra, 2021), and the perceived quality of the product affects the overall shopping satisfaction of the user (Tsiotsou, 2006). In our research, perceived quality is a comprehensive subjective judgment by LSS users about the quality of goods purchased through LSS methods. When users perceive that their purchased products have good quality, their satisfaction with LSS also increases; therefore, we believe that the following relationship exists between perceived quality and satisfaction:

H5. Perceived quality is positively associated with LSS users' satisfaction.

In a previous study on mobile instant messaging, researchers measured the performance of service providers in terms of perceived quality of service (Oghuma et al., 2016). In the context of LSS, perceived product quality can also be used as a component to measure the perceived performance of this business model. When LSS users are more positive about the subjective judgment of the quality of the purchased product, their initial expectations for quality will be positively confirmed; otherwise, they will be negatively disconfirmed. It is worth noting that high return rates may be attributable to issues related to product quality. Therefore, the relationship between perceived quality and confirmation needs to be verified in the post-purchase phase. Based on this, we propose the following hypothesis:

H6. Perceived quality is positively related to confirmation.

Relationship between perceived discounts(PD), satisfaction and confirmation. A discount is a form of reward offered by the seller to the buyer in recognition of specific actions or activities
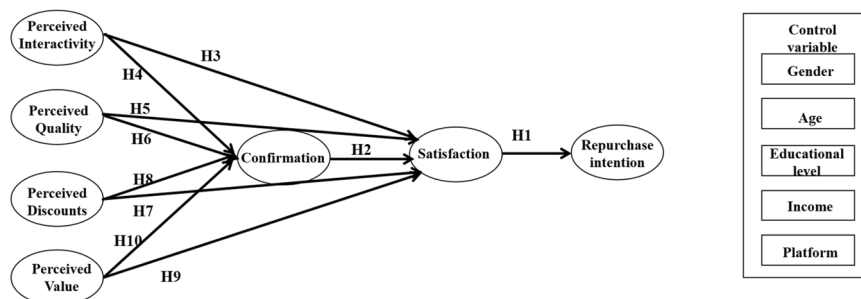
Fig. 5 The research model. The proposed model explores the self-perceived customer experience and repurchase intention in live streaming shopping. The mediating variables are confirmation and satisfaction.

performed by the buyer. Perceived discounts refer to the level of price benefits that users feel are offered when buying products through live streaming.

Some studies have shown that the relationship between perceived discounts and satisfaction was not supported in some research. Khairawati (2020) examined the impact of promo price discounts on satisfaction and concluded that these discounts do not affect satisfaction. They further explained that price is not the main factor influencing consumer behavior. We also noticed a positive relationship between perceived discounts and satisfaction. In the context of purchasing tickets online, the discount variable significantly impacts customer satisfaction (Dewi and Kusumawati, 2018). Li et al. (2020) verified that a large-scale promotion positively impacts the satisfaction of the Double Eleven Shopping Festival in terms of trust and fun. However, the High performance-cost ratio has always been emphasized by LSS as one of their advantages. When users purchase discounted products through LSS, their overall satisfaction tends to increase. Therefore, we believe that:

H7.Perceived discounts are positively associated with users'satisfaction.

The commodity discount is the main reason that many live streaming consumers choose this new way of shopping. In the LSS business model, any live streamer who can negotiate cheaper rates without sacrificing the quality of the items or services given during the live-streaming transaction is eligible (Zhong et al., 2022). The live streamer's strong bargaining power stems from their large fan base and the ease of reaching a wide range of consumers through the live streaming room. During this process, LSS users' price expectations are confirmed by each discounted product. Therefore, we believe that:

H8. Perceived discounts are positively related to confirmation.

Relationship between perceived value(PV), satisfaction and confirmation. The users' perception of interactivity, quality, and price discounts in LSS is influenced by the performance of the way itself. However, consumers not only experience benefits but also make sacrifices, such as investing their time, money, and energy in the process of engaging with LSS. Therefore, value is a cognitive-based concept that encompasses the disparity between perceived benefits and sacrifices, similar to how disconfirmation reflects variations between expectations and perceived performance (Patterson and Spreng, 1997). Perceived value is a trade-off (Sánchez et al., 2006). As mentioned earlier, satisfaction is an intrinsic indicator of the user experience. Numerous studies have confirmed that perceived value can be a significant antecedent of satisfaction. Fazal and Kanwal (2017) discovered a positive relationship between customers' perceived value and their satisfaction in the mobile service industry. Similarly, Uzir et al. (2021) verified through the expectation disconfirmation theory that perceived value has a positive impact on service satisfaction among home

delivery personnel. When consumers perceive a balance between their sacrifices and gains through the use of LSS, they will be satisfied with their choice. Based on this, we put forward the following assumptions:

H9. Perceived value is positively associated with users'satisfaction.

Considering that a significant portion of LSS users have limited resources in terms of energy, time, and money, they form certain expectations regarding their efforts and potential returns before opting for LSS as a shopping method. As consumers engage in LSS repeatedly, their perception of the balance between the benefits they receive and the costs they incur determines whether their initial expectations are positively validated or negatively disconfirmed. Therefore, we believe that the following relationship exists between perceived value and confirmation:

H10. Perceived value is positively related to confirmation.

Previous studies have proven that gender, educational background and income have different effects on shopping behavior (Rong-Da Liang and Lim, 2011; Wang et al., 2000). As this is a new and increasingly popular way of shopping, we also selected gender, age, education level, income and platform of LSS as control variables to explore whether the similarities and differences in these aspects affect LSS users'willingness to repurchase. By summarizing the previous research, we propose relevant hypotheses and build the research model in Fig. 5.

Data and empirical results
In order to validate the proposed conceptual model, this study employed the structural equation modeling (SEM) method, as recommended by Hair Jr and Sarstedt (2019), who regarded SEM as superior to multiple regression for examining complex relationships between constructs. SEM has gained popularity in the social sciences due to its strengths. The research methodology and data analysis procedure are illustrated in Fig. 6.

Sample. We gathered online questionnaires to validate the proposed research model. Between July 6, 2022, and September 16, 2022, we produced and disseminated surveys in China using the well-known online survey platform Questionnaire Star (https://www.wjx.cn). Before the questionnaire was formally distributed, we did two pre-surveys and modified the expression of some questionnaire items to reduce the cognitive ambiguity of the respondents. Furthermore, to ensure a comprehensive representation of the data population, the researchers utilized WeChat and other social media platforms to broaden the reach beyond college students who initially participated in the Q&A.

The research questionnaire includes two parts. This study explores the repurchase intention of LSS users, so we excluded respondents who initially reported no prior experience with LSS. The first part of the questionnaire consists of a specific scale
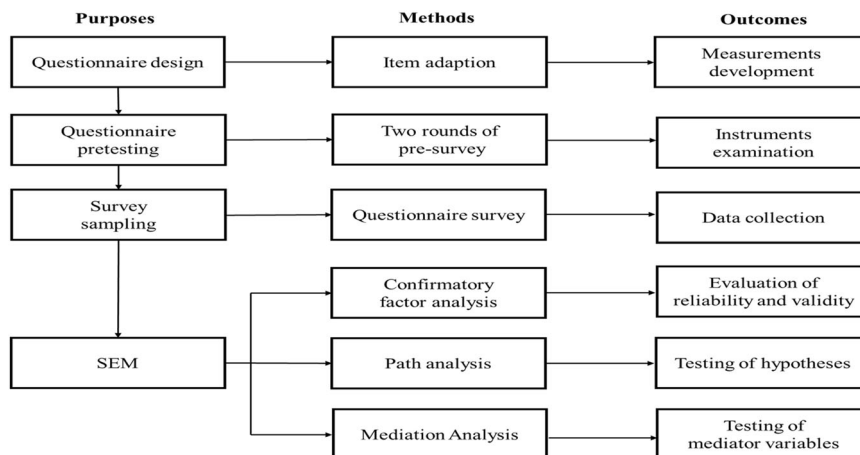
Fig. 6 The research flow diagram. This conceptual diagram shows the procedure of research methodology and data analysis.

Table 2 Demographic profile of respondents.

	Category	Number (N = 507)	Percentage (%)
Gender	Men	208	41.03%
	Female	299	58.97%
Age	Under 18 years old	62	12.23%
	18–25 years old	173	34.12%
	26–35 years old	159	31.36%
	36–50 years old	91	17.95%
	Over 50 years old	22	4.34%
Education Background	Junior high school	35	6.90%
	High School	83	16.37%
	Undergraduate	292	57.59%
	Master's degree and above	97	19.13%
Occupation	Students	94	18.54%
	Civil servants	84	16.57%
	Corporate staff	283	55.82%
	Freelancer	27	5.33%
	Other	19	3.75%
Monthly income	Under 2000 yuan	92	18.15%
	2000–5000 yuan	64	12.62%
	5001–10000 yuan	247	48.72%
	10000–20000 yuan	75	14.79%
	More than 20000 yuan	29	5.72%

Table 3 Descriptive statistics on the basic usage patterns of live streaming users.

	Category	Number (N = 507)	Percentage (%)
Duration of live streaming shopping platform usage	Within half a year	84	16.57%
	Less than half a year	124	24.46%
	Half a year to one year	199	39.25%
	1 to 2 years	61	12.03%
	Over 2 years	39	7.69%
Average monthly cost of live shopping	Under 500 yuan	145	28.60%
	500–1000 yuan	101	19.92%
	1000–2000 yuan	48	9.47%
	2000–4000 yuan	147	28.99%
	4000–6000 yuan	43	8.48%
	6000–10000 yuan	16	3.16%
	More than 10000 yuan	7	1.38%
Choice of platform	Taobao	135	26.63%
	Tik Tok	137	27.02%
	Others	235	46.35%

consisting of 29 measurement items. This scale aims to assess the relationship between self-perceived, LSS users'confirmation, satisfaction, and repurchasing intentions within the live-streaming e-commerce context. The second section includes a survey of the respondents' fundamental characteristics, such as gender, age, employment, etc. This information is utilized to understand the behavioral traits of LSS participants. A 7-point Likert scale was used to measure the seven variables in the model (perceived interactivity, perceived quality, perceived discounts, perceived value, confirmation, satisfaction, and repurchase intention). In response to our questions, the respondents chose the answers that best matched their subjective feelings from "strongly disagree" (1) to "strongly agree" (7). This study questionnaire's design was based on earlier research literature, which ensures the repeatability of the questionnaire to a certain extent. Finally, 507 valid data were used for subsequent analysis. Table 2 is a list of the respondents' demographic characteristics.

According to Table 2, there were more females than men (58.97% vs 41.03%). The interviewees were mainly young people, with the proportion of 18–35 years old reaching 65.48% in total, while those under 18 years old (12.23%) and over 50 years old (4.34%) were less, and those between 36 and 50 years old accounted for 17.95%. The participants in the survey were mainly enterprise employees, accounting for 55.82%. Therefore, 48.72% of the income data were concentrated in the 5000–10000 section, which is more in line with the current distribution of live streamers carrying goods. Finally, LSS is a kind of shopping method developed in recent years, and people with higher education have higher participation. A total of 76.73% of the interviewees had a bachelor's degree or above.

We summarized the relevant consumption behaviors of live streaming consumers in Table 3. Table 3 shows that 92.31% of users had shopped on live streaming for less than two years. This indicates that this way of shopping has recently been tried and accepted by people. TikTok and Taobao account for the most significant proportion of live shopping, with 27.02% and 26.63%, respectively. Finally, through statistics, we also found that the

Table 4 Individual item reliability of potential user group.

Indicator	Factor Loading	Mean	SD	Cronbach's α	CR	AVE
PI1	0.839	4.87	1.494			
PI2	0.759	5.14	1.435	0.881	0.883	0.655
PI3	0.829	4.61	1.759			
PI4	0.808	4.83	1.647			
PQ1	0.829	4.77	1.398			
PQ2	0.808	4.73	1.429			
PQ3	0.809	4.74	1.449	0.914	0.914	0.681
PQ4	0.838	4.70	1.453			
PQ5	0.842	4.77	1.492			
PD1	0.803	5.2	1.264			
PD2	0.828	5.17	1.278			
PD3	0.827	5.19	1.318	0.908	0.908	0.665
PD4	0.812	5.15	1.297			
PD5	0.806	5.19	1.293			
PV1	0.859	4.91	1.295			
PV2	0.805	4.90	1.268	0.905	0.904	0.703
PV3	0.839	4.90	1.287			
PV4	0.850	4.93	1.282			
CO1	0.865	4.91	1.292			
CO2	0.840	4.94	1.232	0.896	0.895	0.682
CO3	0.799	4.99	1.247			
CO4	0.797	4.99	1.257			
SA1	0.834	5.13	1.263			
SA2	0.861	5.08	1.291	0.923	0.919	0.740
SA3	0.885	5.02	1.311			
SA4	0.861	5.11	1.278			
RE1	0.822	4.99	1.319			
RE2	0.842	4.89	1.352			
RE3	0.836	4.98	1.298	0.924	0.924	0.709
RE4	0.855	4.87	1.351			
RE5	0.854	4.99	1.334			

All factor loadings were significant at $p < 0.001$;
SD Standard deviation, *PI* Perceived interactivity, *PQ* Perceived quality, *PD* Perceived discount, *PV* Perceived value, *CO* Confirmation, *SA* Satisfaction, *RE* Repurchase intention.

Table 5 Fornell and Larcker discriminant validity.

PI		PQ	PD	PV	CO	SA	RE
PI	0.809						
PQ	0.326	0.825					
PD	0.456	0.473	0.815				
PV	0.409	0.503	0.591	0.838			
CO	0.450	0.445	0.575	0.502	0.826		
SA	0.495	0.504	0.520	0.630	0.601	0.862	
RE	0.586	0.582	0.624	0.673	0.697	0.721	0.842

The diagonal value represents the square root of the AVE.

Table 6 Heterotrait-Monotrait Ratio (HTMT).

HTMT	PI	PQ	PD	PV	CO	SA	RE
PI	—						
PQ	0.336	—					
PD	0.457	0.473	—				
PV	0.410	0.499	0.588	—			
CO	0.450	0.444	0.572	0.502	—		
SA	0.493	0.508	0.520	0.626	0.601	—	
RE	0.588	0.583	0.626	0.673	0.700	0.725	—

consumers in this study mainly spent 2000–4000 yuan (28.99%) and 500 yuan (28.60%) in the broadcast room each month.

Reliability and validity. We used AMOS 22.0 and SPSS 25.0 to assess the sample data's reliability and validity. We often used Cronbach's α for testing. The results in Table 4 show that Cronbach's α for each variable is more significant than 0.8, greater than the commonly recommended 0.7. In addition, the validity of convergence is judged by confirmatory factor analysis (CFA) of standardized factor load and its significance. Table 4 demonstrates that the composite reliability (CR) of each latent variable is greater than 0.8, and the average variance extraction (AVE) is higher than 0.6, indicating that the three requirements proposed by Fornell and Larcker (1981) are met.

Discriminant validity measures the extent to which a concept and its indicators differ from other factors (Bagozzi et al., 1991). According to Fornell and Larcker (1981), if the square root of the AVE value is greater than the correlation coefficient between two concepts, as Table 5 shows, these variables have discriminant validity. Henseler et al. (2015) further proposed the Heterotrait–Monotrait ratio (HTMT), when the ratio of correlations within the construct to correlations between the construct is below 0.85, which can also verify the discriminant validity. The HTMT value in Table 6 is less than the recommended value. The result of the Fornell-Larcker condition and HTMT ratio indicates that the construct in this study has discriminant validity.

Common method and non-response bias. Considering the potential issue of common method bias in the data collected through questionnaires, we employed two approaches to examine this possibility: First, we conducted a single-factor test using IBM SPSS Version 25. All indicators were subjected to an unrotated exploratory factor analysis (EFA) to identify the primary factor accounting for the majority of variance. The purpose of this analysis was to detect the presence of common method bias, as suggested by Harman (1967). The results revealed that the first factor captured 43.705% of the total variance, which is less than the commonly used threshold of 50%. Second, we conducted additional tests following the approach suggested by Cote and Buckley (1987). Specifically, we employed confirmatory factor analysis (CFA) to estimate two competing measurement models: Model1: each item loads solely on its respective latent factor; Model2: In addition to loading the items on their respective latent factors, an additional common latent factor(CLF) was included. We observed that adding the CLF in Model 2 did not substantially improve the model fit compared to Model 1 (see Table 7). The results suggest that common method bias is not a concern in our study. To check for non-response bias, we conducted a t-test to compare the responses from the first and last 15% of participants on all the primary constructs. The results revealed that none of the tests were statistically significant. This indicates that non-response bias was not a significant issue in our study.

Finally, we tested the fitting coefficient of our model. Most of the metrics shown in Table 7 are above the recommended values, showing that the goodness of fit of the measurement model is satisfactory.

Hypothesis testing. A structural equation modeling (SEM) approach was adopted to test our hypotheses (Bagozzi, et al., 1991). The results of the data support most of the hypotheses we previously proposed. Figure 7 reveals the standardized path coefficients of the research model.

As we hypothesized a positive relationship between self-perceived and confirmation, H4, H6, H8 and H10 are verified by the data results, among which perceived discounts ($\beta = 0.325$, $p < 0.001$) have the most significant influence on confirmation,

Table 7 Goodness-of-fit test.

Goodness-of-fit measures	χ^2/df	RESEA	GFI	AGFI	CFI	IFI
Recommended value	≤3	≤0.08	≥0.8	≥0.8	≥0.9	≥0.9
CFA model1(no CLF)	2.224	0.049	0.894	0.873	0.958	0.958
CFA model2(with CLF)	2.225	0.049	0.902	0.872	0.967	0.961
Structural model	2.651	0.057	0.877	0.854	0.943	0.943

RMSEA root mean square error of approximation, *GFI* goodness-of-fit index, *AGFI* adjusted goodness-of-fit index, *CFI* comparative fit index, *IFI* incremental fit index.
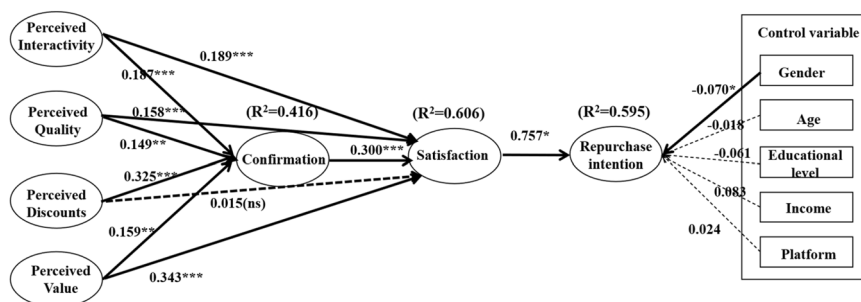
Fig. 7 Path analysis of the research model. Notes: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; —means ns (not supported).

Table 8 Research hypothesis results.

Estimated path			Path coefficients	Hypotheses	Results
Satisfaction	→	Repurchase intention	0.757*	H1	Supported
Confirmation	→	Satisfaction	0.300***	H2	Supported
Perceived interactivity	→	Satisfaction	0.189***	H3	Supported
Perceived interactivity	→	Confirmation	0.187***	H4	Supported
Perceived quality	→	Satisfaction	0.158***	H5	Supported
Perceived quality	→	Confirmation	0.149**	H6	Supported
Perceived discounts	→	Satisfaction	0.015	H7	Not supported
Perceived discounts	→	Confirmation	0.325***	H8	Supported
Perceived value	→	Satisfaction	0.343***	H9	Supported
Perceived value	→	Confirmation	0.159**	H10	Supported

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

which means that price or discount still plays a prominent role in attracting the users of live streaming platforms to shopping. In contrast, the correlation between perceived quality ($\beta = 0.149$, $p < 0.01$) and confirmation was the lowest. In LSS, low prices are used to encourage consumers to purchase goods. As an old saying goes, a price relates to quality. Perhaps users have to lower their product quality expectations to accept a cheaper price. The data results of this paper show that perceived interactivity ($\beta = 0.187$, $p < 0.001$) and perceived value ($\beta = 0.159$, $p < 0.01$) also have a significant influence on confirmation.

Satisfaction is a key variable that influences repurchase intention; the more satisfied users are, the greater their repurchase intention is. The data results shown in Fig. 7 also prove that H1 is valid and that the connection between satisfaction ($\beta = 0.757$, $p < 0.001$) and repurchase intention is significant. In addition, satisfaction can be influenced by other variables. When consumers' previous expectations of LSS are confirmed in the actual use process, this self-perceived will improve user satisfaction, which can help to explain why confirmation has a significant influence on satisfaction. H2 is also supported. As shown in Fig. 7, we also found that most variables except perceived discounts ($\beta = 0.015$, $p > 0.05$) can directly and significantly improve user satisfaction, so H7 is

invalid. At the same time, H3, H5 and H9 are supported by the data. As we discussed before, low prices and discounts attract users to adopt live streaming platforms. However, due to their sensitivity to the cost of money, it is a long-term process for users to form a perception of the price benefits provided by each subject. Therefore, the perceived discounts do not directly lead to increased satisfaction, which may need to be transmitted through other variables, so we test the mediating effect in Section "Mediation Analysis".

Among the control variables, in addition to the variable of gender, differences in personality traits such as age do not affect the repurchase intention of live streaming users. Finally, our research model shows good prediction power (R^2. The model accounts for 59.5% of the variation in repurchase intention. Confirmation and four self-perception variables together explain 60.6% of the variance in satisfaction. Similarly, perceived interactivity, perceived value, perceived quality and perceived discounts together explain 41.6% of the variance of confirmation. All hypothetical results are listed in Table 8.

Mediation analysis. Path analysis of the study model in Table 8 illustrates the direct significant association between each variable.

Table 9 Mediation effect analysis.

		Point Estimate	SE	Bias-corrected 95% CI			Percentile 95% CI			
				Lower	Upper	P	Lower	Upper	P	
PI→CO→SA	Indirect effect	0.056	0.020	0.025	0.105	0.001	0.021	0.099	0.001	PM
	Direct effect	0.189	0.049	0.092	0.282	0.001	0.098	0.289	0.000	
PQ→CO→SA	Indirect effect	0.045	0.020	0.012	0.091	0.009	0.009	0.086	0.016	PM
	Direct effect	0.158	0.058	0.033	0.265	0.007	0.045	0.276	0.004	
PD→CO→SA	Indirect effect	0.097	0.029	0.050	0.169	0.000	0.046	0.158	0.000	CM
	Direct effect	0.015	0.061	−0.109	0.133	0.816	−0.107	0.135	0.780	
PV→CO→SA	Indirect effect	0.048	0.022	0.012	0.102	0.012	0.006	0.094	0.026	PM
	Direct effect	0.343	0.058	0.233	0.460	0.000	0.219	0.450	0.000	

CM Complete mediation, *PM* Partial mediation, *CI* confidence interval.

However, there is a mediator variable between the four self-perceived variables and satisfaction, and the mediation effects of confirmation are still unclear. The causal steps approach and the product of coefficients approach represent the traditional mediating effect test methods, but these ways will result in much lower goodness-of-fit indices. To better avoid errors, we adopted the bootstrapping product of coefficients approach proposed by MacKinnon et al. (2002) to test the mediating role of confirmation. If the indirect effect does not include 0 in the 95% confidence interval, the mediating effect can be determined to be significant (Preacher and Hayes, 2008).

The results of the mediation effect between self-perceived variables and satisfaction are listed in Table 9. We found that all indirect effects are significant, which means that the formation of user satisfaction with live streaming platforms is based on their own experience in comparison with and confirmation of their own expectations for interactivity, discounts, etc. In addition, among all the mediating effect paths, except for the direct effect of perceived discounts, which is nonsignificant, the rest are significant. Accordingly, confirmation plays a partial mediating role between perceived interactivity, perceived quality, perceived value and satisfaction. The direct effect of perceived discounts and satisfaction does not exist because the mediation effect is significant, so confirmation completely mediates the relationship between perceived discounts and satisfaction. Chen, et al. (2020) also found that perceived discounts has no influence on consumer satisfaction, but they did not provide a detailed explanation. As we introduced before, the perceived discounts do not directly lead to an increase in satisfaction, which may need to be transmitted through confirmation.

Discussions and implications

Discussions. As discussed in the introduction section, the purpose of this study is to explore whether LSS users' current perception of consumer experience is consistent with their initial expectations. Therefore, we refined the self-perceived performance of LSS users' experiences into four key aspects (interactivity, cost-effectiveness, discounts, and product quality), which collectively encompass the subjective perceptions of users during LSS usage to a significant extent. Statistical results indicate that four self-perceived performance variables positively impact consumers' confirmation when using LSS.

In addition, we introduced the intermediate variable of confirmation between self-perceived performance and satisfaction, and the statistical results confirm the mediating role of confirmation. The conclusion regarding the significant relationship between self-perceived performance and confirmation, along with its positive impact, is supported by studies on fintech security and website design usefulness. Some studies considered discounts, interactivity, etc., as a stimulating external factor to explore the effect on LSS users' purchase intention (Zhong et al., 2022), while they ignored the fact that users consistently compare their experiences with initial expectations during the usage process before satisfaction is formed. In the context of LSS, when users have a good experience, their confirmation of previous expectations increases, which, in turn, will increase user satisfaction.

The findings indicate satisfaction significantly and positively impacts the intention to repurchase among LSS users, which is consistent with the conclusions of many studies (Meng and Lin, 2023). Exploring the repurchase intention of LSS users is essentially an exploration of their satisfaction. Satisfaction is an antecedent variable of repurchase intention, but it is also affected by other factors. Our research further confirms whether the level of product quality perception will affect user satisfaction or not (Izzudin and Novandari, 2018; Laosuraphon and Nuangjamnong, 2022). In addition, the real-time interactivity offered by LSS is a key advantage compared to other forms of online shopping; the interactive design gives users a sense of immersion (Joo and Yang, 2023). Wu and Huang (2023) divided perceived value into three distinct dimensions: perceived value, hedonic value, and social value. In our study, perceived value refers to the overall perception of the balance between the benefits received and the costs incurred. The positive relationship between perceived value and satisfaction highlights the importance of LSS in providing users with a positive perception of cost-effectiveness.

The findings did not reveal a direct relationship between perceived discounts and satisfaction, which is against the conclusion that users' satisfaction is enhanced when they perceive a pricing advantage in their shopping behavior (Khan et al., 2015; Prawita et al., 2020). Instead, their relationship appears to rely entirely on the confirmation variable for mediation. This lack of significance in their direct relationship is also supported by other studies (Khairawati, 2020; Mohammad, 2015). We believe that LSS users are value hunters who look hard for the best offers to ensure they receive good value for their money. This new finding implies that user satisfaction is enhanced only when they confirm the existence of discount benefits through LSS.

Finally, our findings revealed an interesting result that all control variables, except for gender, demonstrated no significant impact on repurchase intention. Perceptions of shopping behavior may differ by gender. The decision-making process in shopping may vary based on gender (Kim et al., 2021).Men experienced greater stress from store shopping than women, whereas women perceived more hedonic gain from store shopping (Roy Dholakia and Uusitalo, 2002). Therefore, LSS platforms and streamers need to understand the purchase

behavior and preferences of users of different genders so as to optimize product selection, live broadcast time, and promotion strategies (Xiong et al., 2023). Moreover, the targeted design of various interactive activities (Hansen and Jensen, 2009) and personalized services (Ali et al., 2022) is essential to unlock additional business opportunities and gain a competitive edge in live e-commerce.

Practical implications. The maturity of a business model depends on whether users continue to use it for shopping. Thus, conducting post-purchase research among LSS users is indispensable for aiding LSS platforms and merchants in optimizing their services more effectively. In light of our research findings, we offer the following practical implications:

First, the real-time interactivity offered by LSS is a key advantage compared to other forms of online shopping. Interactive functions can not only improve the atmosphere, but also attract more consumers to participate (Carlson et al., 2018). Therefore, it is necessary to constantly enhance the interactivity of LSS platforms. By facilitating interaction, consumers, streamers, and merchants can develop direct or indirect relationships while shopping via live streaming platforms. Consequently, this helps bridge the gap between users and streamers, fostering enhanced satisfaction in merchants and streamers.

Second, the higher the perceived discounts of LSS users, the stronger the confirmation, while discounts do not mean permanent business success. When merchants carry out discount promotions, if consumers think that the sales price is higher than the inner reference price, consumers do not feel that they are receiving preferential treatment, and their evaluations of transaction value and purchase intention are lower (Green, 1995). Different price discount methods will have different effects on sales (Wang et al., 2020). In addition, due to the law of diminishing marginal utility, in the process of watching live streaming, if consumers are exposed to some similar preferential information many times, it appears in an undifferentiated cycle. Preferential information may work over a short period of time, but visual and auditory fatigue will occur with time, and boredom will decrease users' repurchase intention. However, selling high-quality products can dispel some of these marketing concerns. Giving users quality confidence can be done in the following ways : (1) streamers who present products should provide third-party inspection reports, such as those from product quality certification institutions, as a form of certification documentation; (2) leveraging brand evaluation information and relying on external forces can also contribute to improving the perceived quality of products; (3) to ensure ethical practices, all parties involved in live streaming should adhere to industry ethics and legal requirements, strictly prohibiting the sale of counterfeit and substandard products. In summary, we suggest that the high discounts and high product quality promoted by LSS should be consistently implemented for a long time.

Finally, customize the streaming experience by creating gender-specific live streaming rooms, such as female-only or male-only rooms, whose design can enhance user engagement and retention by offering a more personalized and immersive environment for different genders.

Theoretical implications. The innovations and contributions of this study are twofold: First, our study mainly focuses on the LSS users' repurchase intention, which belongs to the post-purchase part. This research focus differs from previous studies that primarily concentrate on pre-purchase aspects, and it's closer to the current development status and problems of LSS, making the study more relevant and valuable. In order to carry out our

research, we adopted a Structural Equation Modeling (SEM) approach to develop a theoretical model that integrates repurchase intention within the expectation-confirmation framework. Our model serves to elucidate the factors influencing the formation of repurchase intention among LSS users. The findings of our study on the relationship between self-perceived, confirmation, satisfaction, and repurchase intention can serve as a valuable reference for future research in this field.

In addition, we compiled the key attributes of LSS. Based on this, we explore the role of the user's subjective confirmation between LSS using perceived experience and user satisfaction. Our findings indicate that perceived interactivity, perceived quality, and perceived discounts have a positive influence on user attitudes and behavioral intention. In addition to focusing on the characteristics of LSS, we added perceived value as an explanatory variable from the perspective of user pay-benefit perception and also obtained a positive significant relationship between perceived value and confirmation and satisfaction. The formation of LSS users ' repurchase intention is a complex process, and there are multiple explanatory variables. The empirical analysis results demonstrate that our research framework can effectively effectively explain and predict LSS users' repurchase intention.

Future research and research limitations
In this study, we utilized ECT to examine the repurchase intention of live streaming consumers and delved into the self-perception of users. Nonetheless, our research work still has some limitations. We hope that our work will serve as a reference for future researchers in this field. Firstly, our study focused primarily on the intention of continuous use among experienced users. Although LSS has achieved great success in business, there is still a substantial portion of consumers who have not yet adopted this way of shopping. In light of this, our research endeavors will delve further into the underlying reasons for consumers' hesitation. This subsequent phase of the study aims to complement our current research findings and provide a complete picture of the determinants influencing users' willingness to use LSS.

Secondly, in the context of LSS, users are presented with various textual and video information during the shopping process. The decision-making process in such circumstances involves the handling of multiple streams of information. Therefore, the combination of ECT and dual-processing theory can be utilized to gain a more in-depth and specific understanding of the reasons for the factors of LSS affecting the users' continuous intention. Moreover, based on subjective questionnaires, capturing eye-tracking data in real LSS shopping scenarios, particularly during interactive sessions and the presentation of discount information, can provide a more objective data foundation for the research analysis.

Lastly, one aspect that was not examined in our study was the actual purchase behavior of users. Many universities in China have established LSS laboratories, so in future research, we can use real transaction data to explore the psychological dynamics and actual purchasing behaviors of LSS users on the basis of complying with the relevant laws as well as research ethics and morals.

Data availability
The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

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Author contributions

MinQin Yi: validation, conceptualization, writing - first draft, investigation; Ming Chen: data curation, methodology, writing- review & editing; Jilang Yang: conceptualization, supervision, data collection. All authors contributed to drafting the study and interpretation of results. All authors have read and agreed to the present version of the manuscript.

Competing interests

The authors declare no competing interests.

Ethical approval

The ethical application for this research was approved by the Academic Committee of Guangdong University Of Science and Technology. All research was performed in accordance with relevant guidelines and regulations.

Informed consent

All online questionnaire survey participants provided informed consent.

Additional information