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To shop or not: Understanding Chinese consumers' live-stream shopping intentions from the perspectives of uses and gratifications, perceived network size, perceptions of digital celebrities, and shopping orientations

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ABSTRACT

Live-stream shopping is experiencing unprecedented growth. However, research in live-stream commerce is in its infancy. The current study integrates uses and gratifications, perceived network size, perceptions of digital celebrities, and experience-focused shopping orientation to clarify motivations for live-stream shopping. Accordingly, the current study used a questionnaire to collect data from 339 Chinese consumers and structural equation modeling to analyze data in AMOS 24. In this study, individuals were motivated by gratifications that were (1) hedonic (perceived enjoyment), (2) utilitarian (self-presentation), and (3) social (social presence and interaction). Moreover, perceived network size significantly predicted perceived enjoyment, social interaction, social presence, and utility. In addition, experience-focused shopping orientation mediated the relationships among perceived enjoyment, self-presentation, social interaction, and live-stream shopping intentions. Finally, the mediating roles of the perceptions of digital celebrities in the relationships of perceived network size with perceived utility, perceived engagement, social interaction, social presence, and self-presentation were confirmed.

1. Introduction

E-commerce, which has grown rapidly in China, is widely acknowledged as an indispensable part of life for Chinese consumers. As a new platform for helping Chinese customers shop online, live-stream shopping has become a tool for business marketing and a driving force behind the growth of e-commerce sales. Live-stream shopping has arguably not only changed the public's consumption habits but also become a new consumer culture, particularly since the coronavirus disease 2019 (COVID-19) pandemic. According to an industry report released in April 2020 by Baidu (2020), the search frequency of the key words "live stream" increased by 120% in China during the pandemic. In addition, famous live-stream celebrities such as Li Jiaqi and Viya have exhibited great commercial value. Li Jiaqi, who was named one of the top 50 Chinese opinion leaders by Forbes in 2019, live streams beauty products on the Chinese platform TikTok, where he has nearly 40 million fans. Luo Yonghao, who is the founder of smart phone maker Smartisan attracted 48 million viewers and earned more than RMB 110 million (approximately US$15.5 million) in his first shopping live stream during the COVID-19 pandemic. The success of live-stream shopping highlights the importance of live streamers in e-commerce. Marketing studies have indicated that influencers have greater influence than traditional endorsers on consumer behaviors because influencers are regarded as

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more reliable information sources who are less controlled by brands (Martínez-López et al., 2020).

The success of live-streaming platforms may also be explained by their various multimedia functions: (1) Streamers can broadcast themselves chatting, eating, or playing games live (Hilvert-Bruce et al., 2018). During live streams, streamers typically organize games to connect and monetize their relationship with viewers. In turn, viewers may send "virtual gifts" to support the streamers (Yu et al., 2018). (2) Viewers can interact with streamers and other viewers in real time by using a chat box, and this interaction may influence streamers and broadcasts (Sjoblom and Hamari, 2017). In this case, live-streaming activities involve not only viewing but also interactions between streamers and viewers (Hu et al., 2017; Wohn et al., 2018). (3) When it comes to e-commerce, the aforementioned functions may promote streamer–consumer interactions, thereby alleviating consumers' concerns and increasing their purchase intention (Zhang et al., 2020a, 2020b). Unsurprisingly, live-stream shopping is successful because streaming platforms perfectly cater to consumers' needs for information, involvement and interaction, and this enhances customers' in-store and enjoyable shopping experiences in e-shopping (Lee, 2005; McMillan, 2006; Pantano and Servidio, 2012; Shopify, 2018).

Increased scholarly attention has been devoted to live-stream shopping and its influences as its popularity and economic importance grow. Studies have explored various aspects of the live-streaming industry, including the drivers and motivations of live-stream shopping (Cai et al., 2018; Xu et al., 2020; Zhang et al., 2020a), consumers' attitudes toward live-stream content (Park and Lin, 2020), consumer engagement in live-streaming commerce (Wongkitrungrueng and Assarut, 2018; Kang et al., 2020), and consumer loyalty toward live-stream shopping (Hsu et al., 2020). However, theoretically integrated models of live-stream shopping intention have yet to be developed. Thus, the current study recommends a framework that incorporates uses and gratification (U&G) theory, network externality theory, perceptions of digital celebrities, and experience-focused shopping orientations to assess the antecedents of live-stream shopping intentions. In the context of live streaming, this study provides insight on enhancing the effects of gratifications on shopping intentions. In addition, an analysis of perceived network size and perceptions of digital celebrities is conducted to clarify the antecedents that may influence gratification seeking. Furthermore, experience-focused shopping orientations are explored to understand individual differences in shopping intentions in the live-streaming context.

The remainder of this paper is organized as follows. Section 2 presents a review of the relevant literature and the proposed hypotheses. Section 3 describes the research methodology. Section 4 and Section 5 describe data analysis. Finally, Section 6 discusses the conclusions and main findings, focusing on the study's practical and theoretical implications as well as its limitations.

2. Literature review and hypotheses

2.1. U&G theory

U&G theory, originally developed in the field of mass communication, is used to explain how individuals are driven to use particular media by psychological and social motives (Katz et al., 1973a, 1973b, 1974). According to U&G theory, individuals actively use media, and they select a type of media on the basis of their needs and motivations (Katz et al., 1973a, 1973b; Rubin, 2002). U&G theory also distinguishes between sought and obtained gratifications: the gratifications that individuals seek may differ from those that they obtain from an experience (Li et al., 2019). People have different motivations to consume the same media; therefore, different users' needs can be met differently by the same media (Katz et al., 1974). Although the theory was developed in the pre-digital era, it has been applied in studies related to the Internet and websites (Flanagin and Metzger, 2001; Stafford et al., 2004), social media (Dhir et al., 2015; Dhir and Tsai, 2017; Gan and Wang, 2015; Osei-Frimpong and McLean, 2018; Dhir, 2015) instant messaging (Leung, 2001; Lo and Leung, 2009), gaming (Li et al., 2015; Wu et al., 2010), mobile devices (Leung and Wei, 2000), VR and augmented reality (AR) (Kaur et al., 2020; Rauschnabel et al., 2017, 2018), and purchase intention (Cheung and Lee, 2009) as well as user behaviors (Cheung et al., 2011). Scholars have further used U&G theory to explore individuals' motives for using specific features of new media, such as photo sharing and tagging (Dhir et al., 2017; Gan and Li, 2018). U&G theory has lately been adopted in the context of live streaming. For example, Kim and Kim (2020) explored social live-streaming service usage through the lens of U&G theory. Sjoblom and Hamari (2017) and Hou et al. (2019) have adopted U&G theory to investigate viewing intention in live-streaming. Kaur et al. (2020) and Hsu et al. (2020) have utilized U&G theory to study consumers' purchase intention and loyalty toward live-streaming services, respectively. Therefore, U&G theory was used as a foundation for understanding live-stream shopping motivations in the present study.

Media studies have identified the following gratifications that may influence users' media adoption: hedonic (Gan and Li, 2018; Gogan et al., 2018; Venkatesh and Brown, 2001; Xu et al., 2012; Cai et al., 2018; Hsu et al., 2020), utilitarian (Gan and Li, 2018; Gogan et al., 2018; Li et al., 2015; Xu et al., 2012; Cai et al., 2018), social (Gan and Li, 2018; Gogan et al., 2018; Li et al., 2015; Hsu et al., 2020), and content-related gratifications (Gan and Li, 2018; Liu et al., 2016). In addition, Yang and Lin (2019) demonstrated that social, enjoyment-related, and fashion-related motivations influence the ubiquitous adoption of mobile social services among elderly mobile-phone users. Li et al. (2019) indicated that in emergencies, the gratifications of communication, solitary play, information seeking, and information sharing influence mobile social media use intentions. Studies in e-commerce have suggested that consumers shop online to fulfill different gratifications, namely hedonic (Choi et al., 2009; Papacharissi and Rubin, 2000; Tamilmani et al., 2019; Trevinal and Stenger, 2014; Wongkitrungrueng and Assarut, 2018; Hou et al., 2019; Cai et al., 2018), utilitarian (Zolkepli et al., 2020; Wongkitrungrueng and Assarut, 2018; Cai et al., 2018), and social (Johnson and Yang, 2009; Wongkitrungrueng and Assarut, 2018; Hou et al., 2019) gratifications. On the basis of relevant findings, the three gratifications following are proposed to understand customers' shopping intentions in the live-stream context: hedonic (perceived enjoyment), utilitarian (utility and self-presentation) and social gratification (social interaction, social presence).

2.1.1. Hedonic gratification

Hedonic motivation, also called perceived enjoyment, is a primary driver of media use and technology adoption (Talukder et al., 2019; Venkatesh et al., 2012; Yang and Lin, 2019). Studies have proven that individuals adopt a particular technology or service if they perceive that using it is enjoyable (Gallego et al., 2016). Consumer research has demonstrated that hedonic motivation stimulates individuals to pursue epicurean, ludic, or festive experiences in shopping activities that have potential entertainment and emotional benefits (Bellenger et al., 1976; Sherry, 1990). Cai et al. (2018) and Wongkitrungrueng and Assarut (2018) have revealed that hedonic motivations explain consumers' intention to engage in live-stream shopping activities. Hsu et al. (2020) determined that entertainment gratification leads to consumer loyalty toward live-stream channels. Studies have established that consumers may derive enjoyment from platform functions, marketing strategies used by streamers, as well as interactions with other users (Dennis et al., 2007; Friedrich et al., 2019; Tseng and Wei, 2020; Wulf et al., 2018). Individuals tend to seek sensations in multiple sensory channels to experience pleasure (Holbrook and Hirschman, 1982). Thus, product virtualization technologies enhance the hedonic motivations of live-stream shopping (Dennis et al., 2007). Besides, research has suggested that the embedded playful features of live streaming can influence perceived enjoyment (Tseng and Wei, 2020). Similarly, Friedrich et al. (2019) found a relationship between social commerce (s-commerce) feature richness and perceived enjoyment. Moreover, the flash-selling strategy utilized by streamers may enhance customers' enjoyment (Wongkitrungrueng and Assarut, 2018). Finally, Wulf et al. (2018) found that the chat function enhances viewers' enjoyment in live streaming. Thus, hypothesis H1 is proposed:

H1: perceived enjoyment has a positive influence on the live-stream shopping intention.

2.1.2. Utilitarian gratification (utility and self-presentation)

In addition to hedonic gratification, utilitarian gratification is another critical determinant of behavioral intention (Gan and Li, 2018; Gogan et al., 2018; Li et al., 2015; Xu et al., 2012; Cai et al., 2018). Utilitarian gratification refers to "goal-oriented, rational, and functionally purposed" behavioral intentions in consumers (Dhar and Wertenbroch, 2000). From the utilitarian perspective, individuals adopt a technology or service if it helps them complete a task or achieve a goal. "Practical" and "goal-directed" gratifications are frequently used in studies on utilitarian gratification (Deng et al., 2010; Tseng et al., 2017, 2018). Therefore, "practical" and "goal-directed" gratifications comprise utilitarian gratifications in the current study.

Apart from "practical," "utilitarian" and "functional" are typically mentioned in marketing research. Regarding shopping, "customers are more concerned with consumption in an efficient and timely manner" (Childers et al., 2001). In addition, customers seek sales, discounts, and bargains (Arnold and Reynolds, 2003). The current study defined perceived utility as the extent to which people believe that live-stream shopping is useful for specific purposes, such as efficiently obtaining high-quality products at a reasonable price.

Regarding "goal-directed" motivations, prior research has indicated that "self-presentation" motivates users to adopt a particular medium (Gan and Li, 2018), technological innovation (Kulviwat, Bruner II and Al-Shuridah, 2009), product (Kim and Jun, 2020), or online game (Lee et al., 2012). For example, luxury items are purchased to enhance social status (Wilcox et al., 2009). Chuah (2019) used the term "fashnology" to describe consumers' intention to adopt technology because of the self-presentation motivation. Live-stream shopping may also help live-stream shoppers produce an image of themselves, and this image may influence how they are perceived and treated by others (e.g., as sociable or fashionable) (Goffman, 1959; Schlenker and Leary, 1982). Scheibe et al. (2016) found self-presentation to be a motivation for using YouNow—a live-stream platform. Similar to self-presentation, social status display is an important factor influencing individuals' behavioral intentions in live streaming (Hou et al., 2019). According to Gan and Li (2018), self-presentation is a utilitarian gratification sought by individuals when they continuously use social media. Similarly, Zafar et al. (2020) determined that self-presentation is a utilitarian gratification sought by individuals when they engage in impulse buying on Facebook. On the basis of the studies of Zafar et al.(2020) and Gan and Li (2018), the current study considered self-presentation as a utilitarian gratification that individuals seek when they engage in live-stream shopping. Therefore, hypotheses H2 and H3 are proposed:

H2: perceived utility has a positive influence on the live-stream shopping intention
H3: self-presentation has a positive influence on the live-stream shopping intention.

2.1.3. Social gratification (social interaction and presence)

Social interaction is essential to every aspect of human life. In live-stream shopping, social gratification results when social interaction is fulfilled. "Social presence" and "social interaction" are frequently used in studies on social gratification (Gan and Li, 2018; Li et al., 2015). Hou et al. (2019) proved that social interactivity and social presence explain individuals' intentions of watching live streams. Hsu et al. (2020) found sociability to be a predictor of consumers' loyalty toward live-stream channels. Therefore, in the current study, social gratifications included social interaction and social presence.

"S-commerce" is a subset of e-commerce in which social media platforms are crucial for promoting products and completing transactions (Wongkitrungrueng and Assarut, 2018). Live-stream shopping platforms are a unique form of social media that enables users to interact with streamers as well as with other viewers (Zhao et al., 2018). Researchers have consistently noted that social interaction drives people to watch television shopping programs (Gumpert and Drucker, 1992; Cortese and Rubin, 2010), and "parasocial interaction" is frequently mentioned in studies of its underlying mechanism (Cortese and Rubin, 2010; Stephens et al., 1996). In the context of social commerce, individuals of an online community can interact with each other and engage in shopping-related activities (Olbrich and Holsing, 2011). Moreover, platform functions such as replying, commenting, liking, and clicking links improve the buyer–seller relationship, which further leads to purchase intentions (Wang et al., 2017; Zhou et al., 2016). Studies on media richness have indicated that synchronous visual communication enhances the interactivity between streamers and viewers (Liao

et al., 2020). Therefore, the current study posits that customers who expect a higher level of interaction with streamers and other viewers are more likely to engage in live-stream shopping.

"Social presence" can be defined as "the degree of salience of the other person in the interaction and the consequent salience of interpersonal relationships" (Short et al., 1976, p. 65). Media psychology researchers explain social presence as a medium's warmth, and thus, social presence is a motive that drives individuals to select a particular medium (Gan and Li, 2018; Jang and Liu, 2019). In the context of the Internet, individuals may sense human warmth and sociability through online interaction with other users, and this has been demonstrated in different contexts, such as social networking site fan pages (Kim et al.,2020), online travel communities (Ukpabi et al., 2019), massive online open course learning (Zhao et al., 2020), VR adoption (Sagnier et al., 2020), AR gaming (Jang and Liu, 2019), online shopping (Dash and Saji, 2008) and social media use (Gan and Li, 2018). In marketing literature, Lu et al. (2016) claimed that social presence influences consumers' social purchase intentions. Beldad et al. (2010) reported similar findings with regard to online shopping. In the context of live streaming, studies have proven that information technology affordances, such as visibility, metavoicing, and guidance shopping, result in the generation of consumers' social presence (Sun et al., 2019). Through frequent interactions, viewers tend to develop a sense of connection with streamers (Hu et al., 2017). The multiple cues and immediate feedback may also give viewers a sense of social presence (Tseng et al., 2019). Moreover, studies on media richness have indicated that viewers' perceived presence may be enhanced when streamers acknowledge the presence of viewers by mentioning them during the show (Lim et al., 2020).

Therefore, hypotheses H4 and H5 are proposed:

H4: social interaction has a positive influence on the live-stream shopping intention.

H5: social presence has a positive influence on the live-stream shopping intention.

2.2. Network externality and sought gratifications

Network externality refers to additional utility as the number of users increases (Zhou et al., 2015; Katz and Shapiro, 1985) and consists of indirect and direct externality (Katz and Shapiro, 1985). Direct externality involves the number of users. For example, as the customer base for live-stream shopping expands, customers can interact with more other customers and receive more information from them. By contrast, indirect externality refers to the complementary functions and services that develop because of the increasing number of users. Network externality, an economics-based concept (Katz and Shapiro, 1985), is used to study the behavior of users in different contexts (Tseng et al., 2018; Zhou et al., 2015; Lin and Lu, 2011).

Network effects are assumed to explain sought gratifications and user intentions in the live-stream shopping context because live-stream shopping is based on communication technology. Scholars have consistently noted that perceived network size is associated with the perceived utility of a communication service because consumers typically believe that agents with a large number of consumers offer high-quality services (Varian, 1999; Strader et al., 2007). Lin and Lu (2011) claimed that network externality is related to perceived usefulness. Signaling theory is another framework for explaining the influence of network effects on the gratifications sought and user intentions in live-stream shopping. In the context of e-commerce, signaling theory posits that consumers refer to informational cues such as perceived network size as signals in evaluating the quality of products or services when they experience difficulty in making such assessments (Friedrich et al., 2019). Similarly, Pavlou and Gefen (2004) found that popularity was a critical indicator of perceptions of product and service quality. A large market share typically provides consumers with an impression of good quality and low prices, and this may cause a bandwagon effect (Katz and Shapiro, 1986; Lee and Kim, 2020; Lin and Lu, 2011; Zhang et al., 2017). For example, Kim and Sundar (2011) claimed that bandwagon heuristics, such as viewer counts and star ratings, affect users' judgment of perceived quality.

Thus, hypothesis H6 is proposed:

H6: perceived network size has a positive influence on the perceived utility.

Perceived network size is a strong indicator of perceived enjoyment in various contexts, including mobile social networking (Gao and Bai, 2014), social networking (Lin and Lu, 2011), mobile instant messaging (Zhou et al., 2015), and digital media (Waddell and Sundar, 2020). In live-stream shopping, a larger perceived network size corresponds to the availability of more people to chat with, which may enhance viewers' perceived enjoyment in live streaming (Wulf et al., 2018). Moreover, streamers often use flash-selling or limited-supply strategies. Thus, competition with many other consumers may also add enjoyment to the live-stream shopping experience (Liu et al., 2019). Thus, hypothesis H7 is proposed:

H7: perceived network size has a positive influence on the perceived enjoyment.

Network effect theory indicates that the goods or service value increases with the number of users that can communicate with each other (Katz and Shapiro, 1985). In other words, a social media platform becomes more valuable as the number of users increases (Sarkar and Khare, 2019). In the context of live-stream shopping, users then can communicate with many other viewers and streamers when the user base is large (Gan, 2016; Tseng et al., 2018), and this increases social interactions and connections. Researchers have proven that intercommunication activities enhance the feeling of social presence (Shang et al., 2012). Lu et al. (2016) demonstrated that s-commerce reinforces social presence in online environments. Thus, the current study assumed that a larger network size enables viewers to interact with more people and enhance their sense of social presence. Furthermore, studies on self-presentation have indicated that seeking social recognition is a motivation of self-presentation (Peng, 2020). Individuals tend to adjust their behaviors according to those exhibited by the majority to garner social recognition (Cialdini et al., 1990). Social norms are representations of what most people do (Cialdini et al., 1990). Social norms help individuals to decide what social behaviors are acceptable and unacceptable (Cialdini et al., 1990). A large perceived network size indicates a large consumer base for live-stream shopping. Thus, perceived network size can be considered a cue of social approval that facilitates self-presentation. Therefore, hypotheses H8 to H10

are proposed:

H8: perceived network size has a positive influence on the social interaction

H9: perceived network size has a positive influence on the social presence.

H10: Perceived network size has a positive influence on self-presentation.

2.3. Mediating role of perceptions of digital celebrities

As the popularity of live-stream platforms increases, streamers with large follower bases have grown in commercial value (Hill et al., 2020; Park and Lin, 2020). These digital celebrities can become key opinion leaders and exert considerable influence on social media platforms (Li, 2018; Park and Lin, 2020). Compared with professional advertising, content produced by digital celebrities is more effective (Welbourne and Grant, 2016) and credible (Chen et al., 2018). Ladhari et al. (2020) demonstrated that the perceived popularity of vloggers influences viewers' intentions to purchase products. Djafarova and Bowes (2020) reported that opinion leaders trigger shopping impulse in Generation Z individuals by evoking positive emotions. Chetioui et al. (2020) indicated that consumers' attitudes toward fashion influencers affect their purchase intentions. Zhu et al. (2020) observed that endorsers' number of followers affect the followers' attitudes toward brands. The logic behind the findings is easy to understand. According to the heuristic–systematic model of information processing (Eagly and Chaiken, 1993), individuals are "economy-minded," that is, they tend to process information using the least amount of effort (Chen and Chaiken, 1999). The perceptions of digital celebrities may serve as a heuristic cue (Todorov et al., 2002). Successful digital celebrities are often regarded as having greater appeal, and they attract more follower interactions than traditional endorsers do (Chen et al., 2016a, 2016b). De Veirman et al. (2017) found that influencers with a large number of followers are regarded as highly popular and likable. The number of followers also increases influencers' perceived opinion leadership. Digital celebrities are also characterized as individuals who are highly competent in specific domains (Katz, 1957) and effective social skills (Katz and Lazarsfeld, 1955). Moreover, the hedonic attitudes and trustworthiness of digital influencers enhance viewers' intentions to buy recommended products (Hill et al., 2020; Park and Lin, 2020; Sakib et al., 2020). In the live-stream shopping context, digital celebrities are often regarded as experts who can provide reliable information and useful purchase suggestions (Chetioui et al., 2020; Zafar et al., 2019). Therefore, highly perceived digital celebrities are expected to assist consumers in efficiently obtaining high-quality products at reasonable prices. As explained by halo effects, consumers tend to hold a favorable attitude toward the brands and products endorsed by highly perceived celebrities (Smith et al., 2010). Thus, the products recommended by highly perceived digital celebrities are more likely to cater to consumers' need for self-presentation. Besides, live-streamers are always considered to be fashion trendsetters. Thus, buying from such individuals may fulfill consumers' needs for self-presentation. Moreover, influential digital celebrities can be assumed to have a large customer base that facilitates perceived enjoyment, social interaction, and social presence. Thus, the following hypotheses are proposed:

H11: Perceptions of digital celebrities mediate the relationship between perceived network size and perceived utility.

H12: Perceptions of digital celebrities mediate the relationship between perceived network size and perceived enjoyment.

H13: Perceptions of digital celebrities mediate the relationship between perceived network size and social interaction.
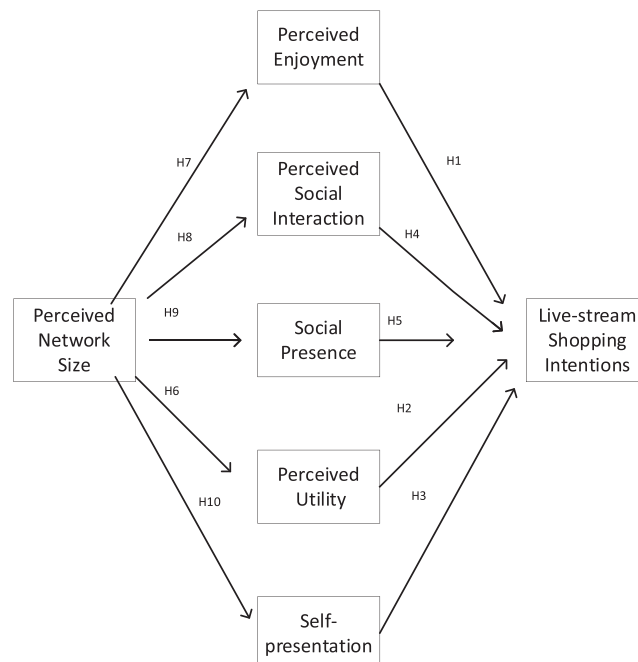

Fig. 1. Theoretical framework and hypotheses of the base model.

H14: Perceptions of digital celebrities mediates the relationship between perceived network size and social presence.
H15: Perceptions of digital celebrities mediate the relationship between perceived network size and self-presentation.

2.4. Mediating role of shopping orientations

Research in marketing has demonstrated that shopping orientations influence consumer behaviors and intentions (Arnold and Reynolds, 2003; Büttner et al., 2013; Dawson et al., 2002; Kaltcheva and Weitz, 2006; Verhoef et al., 2009). Although shopping orientations can have different labels, two general orientations have been identified: task focused and experience focused (Babin et al., 1994). Scholars have argued that online stores attract customers with a certain shopping orientation (Vijayasarathy, 2001). According to Büttner et al. (2013), task-focused consumers may make decisions efficiently and focus on relevant products. By contrast, experience-focused consumers may perceive value in browsing, and they may be more receptive to irrelevant information. According to Mathwick and Rigdon (2004), the experiential value of e-commerce participation is driven by perceived interactivity, telepresence, and user engagement, all of which are empowered by advanced technology. In the live-streaming context, products are not displayed in the traditional manner. Instead, streamers demonstrate products one after another. Merely viewing a seller displaying or wearing clothes can be an enjoyable experience (Wongkitrungrueng and Assarut, 2018). Moreover, some customers can gain enjoyment from interactions with other customers (Wulf et al., 2018). Gaining a sense of social presence (Dash and Saji, 2008) and having the opportunity for self-presentation (Wilcox et al., 2009) may also add value to the shopping experience. Thus, in the context of live-stream shopping, the following hypotheses are proposed:

H16: Experience-focused shopping orientation mediates the relationship between perceived enjoyment and live-stream shopping intention.

H17: Experience-focused shopping orientation mediates the relationship between social interaction and live-stream shopping intention.

H18: Experience-focused shopping orientation mediates the relationship between social presence and live-stream shopping intention.

H19: Experience-focused shopping orientation mediates the relationship between self-presentation and live-stream shopping intention.

All hypotheses for the base model are summarized in Fig. 1.

3. Methodology

3.1. Construct measurement

Nine constructs, namely perceived network size, perceived enjoyment, social presence, social interaction, utility, self-presentation, perceptions of digital celebrities, experience-focused shopping orientation, and live-stream shopping intention, comprise the research model. Multiple-item scales were used to measure all constructs. The measurement items of relevant studies were adapted to correspond with the live-stream shopping context.

For perceived enjoyment and perceived network size, items were adapted from the studies of Lin and Bhattacherjee (2008) and Papacharissi (2002), respectively. For social interaction, items were adapted from the studies of Papacharissi (2002) and Rauschnabel et al. (2017). For social presence, items were modified from the studies of Li et al. (2015) and Kim (2011). For self-presentation, items were adapted from the study of Goffman (1959), and those for utility were modified from studies of Chuah et al. (2016) and Venkatesh et al. (2012). For perceptions of digital celebrities, items were adapted from the studies of Noelle-Neumann (1985), Twing-Kwong et al. (2013), and Terres et al. (2015). For experience-focused shopping orientation, items were adapted from the study of Büttner et al. (2014). Finally, for live-stream shopping intention, items were adapted from the studies of Sokolova and Kefi (2020). To measure all items, a 5-point Likert scales ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) was used. Moreover, ages were expressed in years,

Table 1
Demographic information of respondents (n = 339).

Measure	Items	Frequency	Percentage (%)
Gender	Male	136	40.10
	Female	203	59.90
Age	≤18	10	2.90
	19–30	165	48.7
	31–40	90	26.5
	41–50	38	11.2
	51–60	20	5.9
	61≤	16	4.7
Education	≤High school	60	17.7
	Undergraduate	246	72.6
	Master's	28	8.3
	Doctor's	5	1.5
Experience	Experienced	185	54.6
	Not Experienced	154	45.4

and sexes were coded using 1 for men and 2 for women. Live-stream shopping experience was coded using 1 for participants with experience and 2 for those without experience, and educational background was measured from high school and below to doctoral degree. Because the original questionnaire was in English, a university professor translated it into Chinese. Another proficient translator translated the Chinese version back into English to evaluate translation accuracy. A pilot test (n = 50) was also conducted.

3.2. Data collection

In April 2020, respondents for the study were recruited using an online questionnaire conducted by a Wenjuanxing.com-affiliated survey company in China. Wenjuanxing.com is the largest questionnaire platform in China. The study yielded a total of 359 responses, which were all evaluated. A total of 20 responses with identical scores for all items were excluded. A final sample of 339 valid responses was analyzed. Respondent demographics are presented in Table 1.

4. Data analysis

4.1. Measurement model analysis

In total, 33 items were used to measure the nine constructs. The items were modified on the basis of relevant studies to ensure that they suited this study's theme and context. Therefore, the content validity of the measurement items was also ensured. Before hypothesis testing was performed, the measurement items' reliability and validity were tested. SPSS 24 and AMOS 24 were used for data analysis. In accordance with the suggestions of Hair et al. (2010), Cronbach's α, composite reliability (CR), and average variance extracted (AVE) were used to evaluate the factor loadings' reliability. A Cronbach's α of ≥0.7 and 0.8–0.9 represents acceptable and high reliability, respectively—which indicates a strong correlation among items or high internal consistency in a construct (Nunnally, 1994). A CR value of ≥0.7 indicates high reliability (Hair et al., 2010). AVE denotes amount of variance that the construct captures with regard to the amount that can be attributed to measurement error, and it should be > 0.5 (Fornell and Larcker, 1981). In this study, all constructs had AVE and CR values exceeding suggested values, indicating adequate convergent validity and composite reliability (Table 2). As presented in Table 3, discriminant validity was verified because each construct's square root of AVE was higher than that of all constructs (Fornell and Larcker, 1981).

Table 2
Reliability and convergent validity analysis.

Construct	Items	Unstd.	S.E.	t-value	P	Std.	SMC	CR	AVE
PDC	PDC6	1				0.863	0.745	0.913	0.724
	PDC7	0.925	0.048	19.345	***	0.839	0.704		
	PDC8	0.958	0.047	20.590	***	0.873	0.762		
	PDC9	0.901	0.048	18.898	***	0.827	0.684		
NS	NS5	1				0.839	0.704	0.912	0.721
	NS6	1.047	0.055	19.096	***	0.859	0.738		
	NS7	1.080	0.057	19.020	***	0.856	0.733		
	NS8	1.100	0.059	18.552	***	0.842	0.709		
SP	SP1	1				0.878	0.771	0.917	0.787
	SP2	1.025	0.046	22.226	***	0.899	0.808		
	SP3	0.987	0.045	21.774	***	0.884	0.781		
UB	UB7	1				0.859	0.738	0.924	0.751
	UB8	1.090	0.051	21.282	***	0.883	0.780		
	UB9	1	0.047	21.433	***	0.886	0.785		
	UB10	1	0.051	19.499	***	0.838	0.702		
SOC	SOC1	1				0.914	0.835	0.931	0.817
	SOC2	0.917	0.037	24.577	***	0.890	0.792		
	SOC3	0.997	0.039	25.534	***	0.908	0.824		
PRE	PRE3	1				0.879	0.773	0.954	0.840
	PRE4	1.138	0.044	25.889	***	0.923	0.852		
	PRE5	1.149	0.043	26.494	***	0.932	0.869		
	PRE6	1.179	0.045	26.376	***	0.930	0.865		
PE	PE1	1				0.885	0.783	0.934	0.826
	PE2	1.084	0.042	25.828	***	0.938	0.880		
	PE3	1.045	0.043	24.267	***	0.902	0.814		
SO	SO4	1				0.901	0.812	0.922	0.797
	SO5	0.948	0.040	23.432	***	0.895	0.801		
	SO6	0.985	0.043	22.876	***	0.882	0.778		
UI	UI5	1				0.747	0.558	0.812	0.591
	UI6	0.924	0.077	11.977	***	0.796	0.634		
	UI7	0.925	0.078	11.901	***	0.762	0.581		

Note: UI, shopping intention; PDC, perceived digital celebrity; NS, perceived network size SO, shopping orientation; UB, utility; PRE, self-presentation; SP, social presence; SOC, social interaction; PE, perceived enjoyment.

Table 3
Discriminant validity test.

	AVE	PDC	SO	NS	UB	PRE	SP	SOC	PE	UI
PDC	0.724	**0.851**								
SO	0.797	0.532	**0.893**							
NS	0.721	0.656	0.708	**0.849**						
UB	0.751	0.538	0.581	0.620	**0.867**					
PRE	0.840	0.319	0.344	0.486	0.399	**0.917**				
SP	0.787	0.457	0.493	0.696	0.571	0.339	**0.887**			
SOC	0.817	0.419	0.453	0.639	0.524	0.311	0.445	**0.904**		
PE	0.826	0.411	0.443	0.626	0.513	0.304	0.436	0.400	**0.909**	
UI	0.591	0.460	0.497	0.701	0.607	0.444	0.652	0.574	0.633	**0.769**

Square root of AVE in bold on diagonals.
Off diagonals are pearson correlation of constructs.

4.2. Structural model analysis

After the research instruments' reliability and validity were assessed, the hypotheses were tested using structural equation modeling (SEM) in AMOS 24. Causal relationships among multiple latent variables can be analyzed using SEM (Bollen, 1989; Iacobucci, 2010). In addition, SEM is advantageous because latent variables with multiple indicators measured with error are considered; by contrast, variable measurements with multiple items are usually condensed into mean scores in regression analyses (Iacobucci, 2009). Moreover, SEM uses model fit indices, which can be used to evaluate model adequacy (Hu and Bentler, 1998; Iacobucci, 2010). In the current study, the fit of the theoretical model was assessed using several goodness-of-fit indices. Absolute fit was first measured using the goodness-of-fit index (GFI), adjusted GFI (AGFI), relative chi-square (χ^2/df), and root mean square error of approximation (RMSEA). Then, the comparative fit index (CFI) was used to measure comparative fit. A small χ^2/df denotes good model fit, and an acceptable χ^2/df falls between 1 and 5 (Wheaton et al., 1977). A CFI of > 0.90 is acceptable (Hu and Bentler, 1999), and an RMSEA of < 0.08 denotes good fit (Brown and Cudeck, 1993). GFI > 0.80 and AGFI > 0.80 are considered acceptable (Byrne, 2012; Chau and Hu, 2001) In the current study, χ^2/df, GFI, AGFI, CFI, and RMSEA values were 2.840, 0.841, 0.804, 0.903, and 0.074, respectively—all of which indicate a model fit that is acceptable. Structural model results are illustrated in Fig. 2. illustrates that all current hypotheses (H1 and H3–H10), except H2, are supported.

5. Mediating effect test

In this study, bootstrapping was used to test the mediation effects. The limitations caused by the questionable distributional
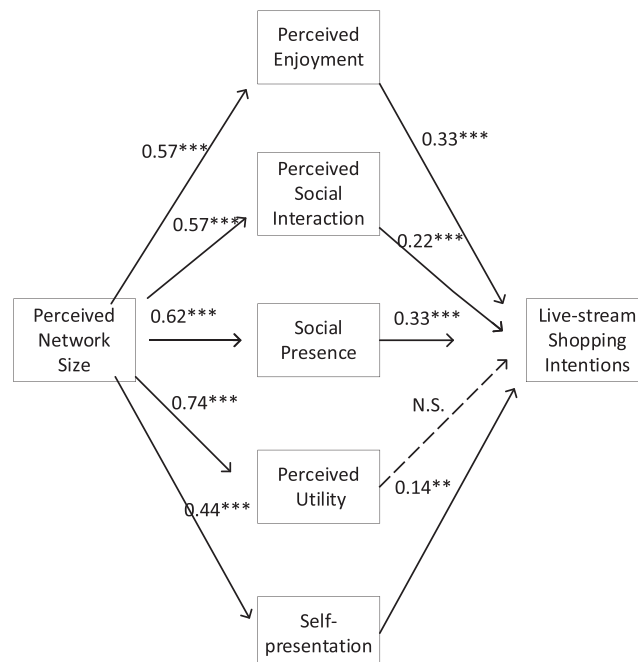
Fig. 2. Standardized estimates of the theoretical framework.

assumptions of traditional methods can be overcome using bootstrapping, which is a nonparametric method that enables the accurate testing of indirect effects (Bollen and Stine, 1990; Shrout and Bolger, 2002). The aforementioned information is valid even in the case of small samples (Preacher and Hayes, 2008). Compared with traditional methods, bootstrapping is more powerful in detecting indirect effects (Hayes and Scharkow, 2013). Bootstrapping is based on data resampling (Efron, 1982), which involves replacing the original sample by drawing numerous new samples of size *n*. In this study, the mediation effects were examined using the bootstrapping method in AMOS 24.0 to estimate the total, indirect, and direct effects. A total of 5000 bootstrap samples were used for investigating the statistical significance, and estimates were obtained within a 95% confidence interval. The indirect and direct pathway estimates are listed in Table 4. Table 4 also lists the 95% confidence intervals and bias-corrected values of the pathways. A mediating effect was confirmed when the confidence interval did not include 0. As presented in Table 4, H11–H14, H16, H17, and H19 were supported.

6. Conclusions

Live-stream shopping, an emerging trend in the field of e-commerce that combines user interaction with the Internet and related participation, has grown in popularity during the COVID-19 pandemic. Research on live-stream commerce remains in its infancy, and a holistic perspective for understanding live-stream shopping intention has yet to be formulated. In this study, a theoretically integrated model was developed to investigate factors affecting live-stream shopping intention. Three types of gratifications significantly affected live-stream shopping intentions: hedonic (perceived enjoyment), utilitarian (self-presentation), and social gratification (social interaction and social presence). The results supported H1, H3-H5. The results suggested that perceived enjoyment, social interaction, social presence, perceived utility and self-presentation were influenced by perceived network size. Thus, H6-H10 were validated. In addition, perceptions of digital celebrities significantly mediated the relationships of perceived network size with perceived utility, perceived enjoyment, social interaction, social presence, and self-presentation, thus confirming H11–H14. Similarly, experience-focused shopping orientation mediated the relationship of perceived enjoyment, social interaction, and self-presentation with live-stream shopping intentions, supporting H16, H17, and H19. The results supported most of the hypotheses (except H2, H15 and H18) and strongly supported the proposed model.

Table 4
Mediating effects of perceptions of digital celebrities and experience- focused shopping orientation.

	Point Estimate	Points of Coefficients		Bootstrapping				Two-tailed significance
				Percentile 95% CI		Bias-corrected Percentile 95% CI		
		SE	Z	Lower	Upper	Lower	Upper	
Standardized direct effects								
NS → UB	0.517	0.061	8.475	0.391	0.628	0.395	0.632	0.000(***)
NS → PE	0.280	0.074	3.784	0.128	0.422	0.131	0.425	0.001(**)
NS → SOC	0.332	0.068	4.882	0.194	0.464	0.197	0.465	0.000(***)
NS → SP	0.304	0.067	4.537	0.168	0.433	0.170	0.436	0.000(***)
NS → PRE	0.329	0.083	3.964	0.169	0.493	0.169	0.493	0.000(***)
PE → UI	0.572	0.052	11.000	0.464	0.671	0.458	0.667	0.000(***)
SOC → UI	0.573	0.062	9.242	0.447	0.689	0.444	0.686	0.000(***)
SP → UI	0.538	0.084	6.405	0.371	0.703	0.369	0.702	0.000(***)
PRE → UI	0.291	0.062	4.694	0.168	0.409	0.167	0.408	0.000(***)
Standardized indirect effects								
NS → UB	0.127	0.043	2.953	0.050	0.216	0.054	0.223	0.002(**)
NS → PE	0.163	0.047	3.468	0.077	0.263	0.080	0.267	0.000(***)
NS → SOC	0.111	0.045	2.467	0.030	0.205	0.033	0.210	0.013(*)
NS → SP	0.227	0.049	4.633	0.133	0.325	0.142	0.334	0.000(***)
NS → PRE	0.042	0.047	0.894	−0.051	0.132	−0.043	0.145	0.409
PE → UI	0.143	0.033	4.333	0.082	0.214	0.086	0.220	0.000(***)
SOC → UI	0.143	0.038	3.763	0.072	0.222	0.076	0.228	0.000(***)
SP → UI	0.134	0.067	2.000	−0.003	0.262	0.003	0.268	0.054
PRE → UI	0.201	0.040	5.025	0.124	0.283	0.129	0.288	0.000(***)
Standardized total effects								
NS → UB	0.643	0.046	13.978	0.542	0.726	0.544	0.727	0.000(***)
NS → PE	0.444	0.058	7.655	0.321	0.550	0.324	0.555	0.000(***)
NS → SOC	0.443	0.056	7.911	0.327	0.549	0.331	0.550	0.000(***)
NS → SP	0.531	0.064	8.297	0.395	0.642	0.397	0.643	0.000(***)
NS → PRE	0.371	0.061	6.082	0.244	0.483	0.247	0.484	0.000(***)
PE → UI	0.715	0.036	19.861	0.640	0.783	0.639	0.782	0.000(***)
SOC → UI	0.716	0.039	18.359	0.634	0.787	0.631	0.784	0.000(***)
SP → UI	0.672	0.041	16.390	0.586	0.744	0.585	0.744	0.000(***)
PRE → UI	0.492	0.051	9.647	0.387	0.587	0.384	0.585	0.000(***)

Note: Standardized estimating of 5000 bootstrapping sample. *p < 0.05 **p < 0.01*** p < 0.001.
Note: UI, shopping intention; PDC, perceived digital celebrity; NS, perceived network size SO, shopping orientation; UB, utility; PRE, self-presentation; SP, social presence; SOC, social interaction; PE, perceived enjoyment.

6.1. Main findings

Unexpectedly, in contrast to our prediction, perceived utility had nonsignificant effects on live-stream shopping intentions. This result is inconsistent with previous findings regarding the intentions to engage with s-commerce sellers (Wongkitrungrueng and Assarut, 2018) and motivations for live-stream shopping (Cai et al., 2018) and smart shopping (Runyan et al., 2012). The aforementioned inconsistency may indicate that culture plays a role in the intention of live-stream shopping. All the aforementioned studies were conducted in non-Chinese contexts. Kacen and Lee (2002) and Sreen et al. (2018) have claimed that culture influences consumers' behaviors. For example, people from collectivistic cultures tend to avoid uncertainties and are more likely than people from individualistic cultures to experience negative feelings after their purchases. Thus, when consumers from collectivistic cultures pursue utilitarian values of products, they may not make purchases from live-stream shopping platforms because the limited-time strategy utilized by streamers provides them limited time to think before their purchase; thus, such consumers may not have sufficient time to consider if the quality of a product is reliable or if its price is reasonable. The other possible explanation is that the data used in the current study were collected during the lockdown imposed due to COVID-19. During the lockdown, consumers may have engaged in live-stream shopping not only for utility purposes but also for passing time or socializing. Moreover, the type of products may need to be considered. For example, Cha (2011) found that different factors affect consumer's intentions to buy virtual and real items. Perceived utility has not been considered in previous studies of virtual item purchase intentions (Huang, 2012; Cha, 2011; Kaur et al., 2020). Also, as Liu et al. (2020) suggested, consumers have a stronger intention to purchase celebrity-endorsed hedonic products than utilitarian products. Thus, the characteristics of products should be considered in future studies.

Hedonic gratification (perceived enjoyment) was a significant predictor of live-stream shopping intentions. This result is consistent with findings for online group buying (Chen et al., 2016a, 2016b), motivations for live-stream shopping (Cai et al., 2018), and engagement with s-commerce sellers (Wongkitrungrueng and Assarut, 2018). The aforementioned findings indicate that a high level of perceived enjoyment in live-stream shopping provides hedonic gratification to consumers and may influence their intentions to engage in live-stream shopping.

Social interactivity and social presence were positively related to live-stream shopping intentions. The result was unsurprising because social live-stream shopping based on social media platforms is characterized by interaction and engagement. This result is in line with the findings of Hou et al. (2019) regarding individuals' continuous watching intentions and consumption intentions in live streaming. Similarly, Wang et al. (2017), Zhou et al. (2016), and Su et al. (2020) have reported that interactivity functions and social presence were significant indicators of purchase intention.

The aforementioned findings indicate that perceived network size is a significant antecedent of perceived enjoyment, social interaction, social presence, perceived utility, and self-presentation. Numerous studies have examined the impact of network size on gratification seeking (Gan, 2016; Tseng et al., 2018; Waddell and Sundar, 2020; Zhou et al., 2015; Lin and Lu, 2011). However, none of the aforementioned studies were conducted in the live-streaming commerce context. To our knowledge, the current study is among the first to explain live-stream shopping intention through the lens of network externality theory. The research findings proved the applicability of network externality theory in the live-streaming context. Moreover, the research findings imply that when the customer base is large, consumers' perceived enjoyment, perceived utility, social interaction, social presence, and self-presentation are enhanced.

In mediation analysis, experience-focused shopping orientation partially mediated the relationships of perceived enjoyment, social interaction, and self-presentation with live-stream shopping intentions. The research findings confirmed that consumers' purchase intentions are influenced by individual differences. These findings are consistent with those of Büttner et al. (2014), who demonstrated that individuals with different shopping orientations typically stress different appeals when shopping. However, the mediating role of experience-focused shopping orientation in the relationship between social presence and shopping intention was not confirmed. This result implies that experience-focused shopping orientation does not influence the relationship between social presence and shopping intentions. This premise is somewhat inconsistent with the findings of Mathwick and Rigdon (2004), who claimed that the experiential value of e-commerce is motivated by consumers' desire for telepresence. This discrepancy indicates that telepresence should be investigated in future studies on live-streaming, especially when the effect of individual differences is being considered. In addition, perceptions of digital celebrities strongly mediated the relationships of perceived network size with perceived utility, perceived enjoyment, social interaction, social presence, and self-presentation. The research findings justified the importance and influence of digital celebrities in e-commerce. Numerous scholars have found that the characteristics of digital celebrities and their posts influence consumers' shopping experiences and purchase intentions (Chetioui et al., 2020; De Veirman et al., 2017; Zafar et al., ,2019). However, the mediating role of perceptions of digital celebrities in the relationship between perceived network size and self-presentation was not confirmed. One possible explanation for this finding is that the sense of self-presentation is fulfilled by the symbolic value of products or technologies (Wilcox et al., 2009; Chuah, 2019; Gan and Li, 2018) but is not influenced by perceptions of digital celebrities.

6.2. Theoretical significance

This study has high theoretical significance. First, the current study is one of the first to explore the factors influencing the intentions of live-stream shopping, which has gained considerable popularity in China, particularly after the COVID-19 pandemic. This study extends current live-streaming commerce research (Cai et al., 2018; Hsu et al., 2020; Wongkitrungrueng and Assarut, 2018; Zhang et al., 2020a) by recommending a comprehensive framework that incorporates the gratification sought by live-stream shoppers, network influence, perceptions of digital celebrities, and consumers' shopping orientations to assess the antecedents of live-stream shopping intentions.

Second, previous U&G-theory-based studies on live-stream shopping intentions have frequently considered utilitarian and hedonic gratifications (Cai et al., 2018; Wongkitrungrueng and Assarut, 2018). The current study enlarged the scope of U&G theory in live-streaming commerce literature by considering social gratifications (i.e., social interaction and social presence). This consideration broadens the spectrum of gratifications and enhances the understanding of the factors influencing live-stream shopping intentions because live-stream shopping is based on sociality.

Third, the findings revealed that the hedonic gratification of perceived enjoyment, social gratifications of social interaction and social presence, and utilitarian gratification of self-presentation have positive effects on consumers' intention of live-stream shopping; however, the utilitarian gratification of perceived utility does not have positive effects on consumers' intention of live-stream shopping. These results indicate that various factors play different roles in fulfilling gratifications.

Fourth, although some studies have explored the relationship between sought gratifications and online shopping intentions, very few of them have considered the individual differences of consumers. The current study revealed the moderating role of experience-focused shopping orientation on the relationship between gratifications sought and live-stream shopping intentions. Mediation analysis is a useful tool in determining how and why gratifications influence live-stream shopping. Moreover, shopping orientation has been examined in numerous studies conducted in offline contexts (Büttner et al., 2013; Kaltcheva and Weitz, 2006) but not in the online context. Thus, the current study enriches the shopping orientation literature by focusing on the context of live-stream shopping.

Fifth, to our knowledge, the current study is one of the first to investigate and demonstrate the applicability of network externality theory to the explanation of live-stream shopping intention. According to studies based on U&G theory and network externality theory, perceived network size was linked with three gratifications in the current study. Future studies in social science may build on the findings of the current study and consider the links between perceived network size and these three gratifications. The current study also provides a new lens through which future scholars can understand the antecedents of gratifications in the e-commerce context.

Finally, this research revealed that perceptions of digital celebrities mediate the relationship between perceived network size and sought gratifications. The mediation analysis indicated the mechanism underlining the relationship between perceived network size and sought gratifications. Live streamers, who are the key component of live streaming, render live-stream shopping distinct from traditional shopping. In line with previous studies Chetioui et al. (2020); Zafar et al. (2019), the halo effect of digital celebrities was confirmed in the current study. Moreover, numerous studies have confirmed the influence of digital celebrities on consumer behaviors (Chetioui et al., 2020; Djafarova and Rushworth, 2017). An important contribution of this study is that it found that digital celebrities influence sought gratifications but do not directly influence purchase intention. This finding adds to the knowledge regarding the influence of digital celebrities in the live-stream shopping context.

6.3. Practical significance

This study also provides insights for practitioners and marketers on retaining current live-stream shopping customers and attracting new customers to this shopping mode. First, the research findings imply that the hedonic gratification of perceived enjoyment predicts consumers' live-stream shopping intentions. Therefore, platform creators should implement system features that enhance live-stream shopping enjoyment. For example, gamification functions, such as bullet screen or flash selling, may enhance the communication between streamers and viewers as well as the enjoyment of live-stream shopping. Merely watching live streaming may cause boredom to viewers; thus, engaging viewers is important in live-streaming commerce. Live streamers, who are the key mediators of live-stream shopping, should include communicative activities, such as games or a lucky draw, during live streaming to increase the enjoyment of live-stream shopping. In line with the findings of Hou et al. (2019), the findings of this research also suggest that the influences of live streamers may determine the success of live-stream shopping. Live streamers who are humorous are assumed to be more enjoyable than those who are not. Therefore, to increase their following, live streamers should select unique, appropriate approaches (e.g., visual, audio, verbal, nonverbal, and technology-supported methods) to presenting their products.

Second, according to the findings of this study, consumers' live-stream shopping intentions are predicted by the social gratifications of social interaction and social presence. Therefore, platform creators should develop sociability functions that facilitate social interaction and social presence. Bullet screens might be an effective function for enhancing the enjoyment of live streaming and the real-time interaction between live streamers and viewers. Platform components such as online communities may also enhance communication among the followers. Moreover, live streamers should pay special attention to their real-time interaction with viewers and use effective communication strategies to enhance the viewers' sense of social presence. For example, live streamers may address viewers' titles and make personalized recommendations when replying to their comments to enhance the viewers' sense of presence. Moreover, live streamers should shorten the response time and improve the response quality because online interactivity can be enhanced through conversational contingency and response latency (Lew et al., 2018).

Third, the research findings suggest that the utilitarian gratification of self-presentation is another predictor of consumers' live-stream shopping intentions. Therefore, live streamers should design and present a fashionable and trendy image to viewers. As explained by halo effects, consumers may form a favorable attitude toward a product because of the person who promotes or endorses it. Moreover, the matching of streamers and products is important in conveying symbolic value. Live streamers should promote trendy or popular products on their shows because these products signal novelty and being fashionable and up-to-date. Moreover, the live-streaming background should be carefully designed. As indicated by previous studies (Aghekyan-Simonian et al., 2012), the atmosphere and display of online stores also convey symbolic values to consumers. Thus, fashionably and delicately designed live-streaming backgrounds may generate favorable feelings within customers. Platform creators should develop functions or virtual goods such as special avatars to fulfill platform users' needs for self-presentation. As Chen and Chen (2020) argued, the intention to purchase virtual goods is strengthened as the intention to express one's self increases.

Fourth, the findings of this study indicate that hedonic, utilitarian, and social gratifications are predicted by perceived network size. Thus, platform creators are advised to display features that enhance consumers' perceived network size, such as the viewing number, comment number, number of products sold, and stock number. These features may serve as bandwagon cues, which may stimulate the seeking of gratifications by consumers and lead to their intentions to engage in live-stream shopping.

Fifth, the influence of digital celebrities was confirmed in the current study. The research findings indicate that selecting influential digital celebrities is essential for the success of live-stream commerce. The findings also imply that digital celebrities should try their best to build good reputations and enlarge their customer bases, which facilitates consumers' seeking of hedonic, social, and utilitarian gratifications as well as their purchase intentions. Last but not least, marketers are suggested to carefully study their live-stream customers' characteristics before making promotion strategies because the aforementioned suggestions are probably more effective with experience-focused shoppers, as the findings suggested.

6.4. Limitations and implications

This study had some limitations that create future research opportunities. First, the current study explored individuals' live-stream shopping intentions but did not consider whether they were novice or experienced users. According to Lee and Kim (2020), the determinants of behavioral intentions in consumers are affected by the preadoption and postadoption stages in innovation. Therefore, future studies can distinguish between novice and experienced users and separately analyze their live-stream shopping intentions. Second, although the current study considered individuals' shopping orientations, it did not consider consumer differences in age and sex. Scholars have claimed that female and older users are more likely than male and younger users are to adopt a new technology or service for social reasons (Venkatesh et al., 2003). Thus, the live-stream shopping intentions of individuals of different sexes and ages can be studied. Third, the current study was also limited in terms of cultural background and population. Because the current study recruited Chinese consumers, the results might be limited to this population. The current findings must be generalized to other modes of shopping and to other countries with caution. Fourth, Lin and Lu (2011) and Kim et al. (2018) have suggested differentiating the number of peers and the number of all users when studying network externality. Kim et al. (2018) found that individuals consider the number of peers and the number of all users differently. Thus, researchers may consider the aforementioned suggestion and divide network externality in future studies. Fifth, the current study did not differentiate social interactions into streamer–viewer interactions and viewer–viewer interactions when examining social gratification. Studies have demonstrated that both community bonding (Sanz-Blas et al., 2019) and parasocial interaction with vloggers (Hsu, 2020) promote consumer's purchase intentions. Therefore, future studies should divide social interactions into streamer–viewer interactions and viewer–viewer interactions to provide more detailed suggestions to marketers and practitioners. They should also consider tie strength because it plays a role in the relationship between interactivity and consumer engagement in the context of live-streaming (Kang et al., 2020). Similarly, Zhang et al. (2020b) suggested that more positive consumer perceptions of their *guan xi* (i.e., "connection") with live streamers leads to stronger purchase intention. Notably, such connections may matter more in collectivistic societies such as China.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Measurement items

Perceived Enjoyment

PE1 I find live-stream shopping to be enjoyable.
PE2 I find live-stream shopping to be fun.
PE3 I find live-stream shopping to be a good approach for relieving boredom.

Social Interaction

SOC1 Live-stream shopping provides me with opportunities to communicate with sellers.
SOC2 Live-stream shopping provides me with opportunities to communicate with other viewers.
SOC3 Live-stream shopping enables me to feel part of the community.

Social Presence

SP1 I like it when other live-stream shopping viewers interact with me.
SP2 I feel good when other viewers agree with my comment.
SP3 When using live-stream shopping, I feel like I am in a virtual reality.

Utility

UB1 I use live-stream shopping because I find it useful.
UB2 I use live-stream shopping because I find it efficient.
UB3 I use live-stream shopping because I find it convenient.
UB5 I use live-stream shopping because it can help me to find higher-quality products.
UB6 I use live-stream shopping because I want to receive product information.

Self-Presentation

PRE3 I use live-stream shopping because I want to be perceived as being fashionable.
PRE4 I use live-stream shopping because I want to be perceived as being open.
PRE5 I use live-stream shopping because I want to be perceived as keeping pace with trends.
PRE6 I use live-stream shopping because I want to be perceived as being trendy.

Perceived Network Size

NS1 Most people in China use live-stream shopping.
NS2 Live-stream shopping has many followers.
NS3 Most of my friends shop during live streams.
NS4 Most people will shop from live streams in the future.

Perception of Digital Celebrities

PKOL1 Digital celebrities have many followers.
PKOL2 Digital celebrities are quite competent.
PKOL3 Digital celebrities have social networks and resources.
PKOL5 Digital celebrities are regarded as a good source for advice.

Shopping Orientation

C2 I like to kill time by shopping.
C3 I like to browse when shopping.
C4 I often have fun when shopping.
C5 I take my time when shopping.

Live-Stream Shopping Intentions

T1 I would recommend live-stream shopping to friends.
T3 Live-stream shopping will be my preferred mode of shopping in the future.
T4 I plan to use live-stream shopping frequently in the future.

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