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**What matters customer engagement in
live streaming e-commerce platform?
(The impact of celebrity live streamer
endorser effectiveness and social
support)**

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1. Introduction

Today, a new form of social commerce known as live streaming shopping (Sun et al., 2019) allows live streamers to simultaneously broadcast and communicate through a public scrolling text screen (Chen et al., 2019). Cai et al. (2018) defined live streaming e-commerce as e-commerce that integrates real-time social interaction through live streams. However, its definition is still relatively obscure for an academic world, a note from one of the Chinese journalist gives a vivid explanation:

“Live streams are the newest shopping experience in China, and with the ability to interact with trusted reviewers in real time, they offer shoppers a more immersive, informative shopping experience than most physical store, e-commerce platforms and home-shopping channels.” (Ruonan Zheng, 2018).

Live streaming e-commerce is one of the most recent methods for businesses to experiment with new product transformation and traffic monetizing. It denotes that companies are using this method to attract customers to participate in the live streaming platform to convince them to buy products; the more people who participate in live streaming platform, the more likely it is that goods will be sold. Therefore, compared to e-commerce, customer engagement is a critical variable in the context of live streaming e-commerce. Previous research (Sun et al., 2019) indicates that customer engagement has a positive impact on customer purchase intention in a live streaming e-commerce context. Therefore, no surprise that more and more businesses are increasingly turning to use live streaming to sell their goods and conduct propaganda. As a result, maturing social media channels (such as Sina, Wechat, xiaohongshu) and traditional e-commerce (such as Taobao, JD, VIP), have created a foundation for the development of live streaming commerce. According to a recent report released by KPMG and Ali Research (“E-commerce Live streaming towards a Trillion Market”, 2020), live streaming e-commerce was predicted to surpass 1 trillion YUAN (around \$158 billion) in 2020. Hence, in this study, I want to broaden the investigation into what factors influence customer engagement in live streaming e-commerce?

Customer engagement, a key component of relationship marketing (Liang et al., 2011) refers to a customer's degree of participation and connection with a company's products or activities (Vivek et al., 2012; Wongkitrungrueng and Assarut, 2020). Although some researchers have studied customer engagement in live streaming e-commerce through perceived values (such as utilitarian, hedonic, and symbolic) (Wongkitrungrueng and Assarut, 2020) and IT affordances (Sun et al., 2019), research to determine ways to improve a customer's sense of engagement, on the other hand, are very limited (Vivek et al., 2012). Live streaming e-commerce platforms are a type of human-computer interaction (HCI) (Sun et al., 2019), which means that everything is dependent on how people behave online. Therefore, it is a challenge for sellers to capture their customers' attention and persuade them to participate in live streaming activities. However, because of enhanced sellers (live streamer) and technological innovation (live streaming), customer engagement in a live streaming e-commerce context would be distinguished from traditional e-commerce.

First, live streaming e-commerce differentiates itself from the other modes of e-commerce because it permits customers interact to in real-time with live streamers and other peers (Kang et al., 2021; Cai and Yvette Wohn, 2019). This advancement allows live streamers to conduct product shows and respond to viewers' comments in real time, by this way, it greatly reduces customers' feelings of uncertainty and perceived risk (Gefen, 2003; Constantinides, 2004; Kozlenkova et al., 2017). In fact, in most cases, customers focus on the live streamer rather than the products or brands. Customers believe the live streamer's suggestions and purchase the goods he or she presents. For example, known as the "King of Lipstick" in China, Li Jiaqi has 40 million fans and 45 million fans in Taobao Live¹ and Douyin², respectively. Apart from lipsticks, he also introduces a variety of products, ranging from cosmetics to snacks. Therefore, products and services in live streaming e-commerce are represented and endorsed by streamers (Chen and Lin, 2018), hence, it is reasonable to assume that in most circumstances,

¹ By using Taobao's live-stream services, he once sold 15,000 lipsticks in just five minutes in 2019.

² It is the video app from Beijing-based Bytedance that has expanded beyond China to hook millions of teenagers in the U.S., India, and elsewhere.

customers participate in platforms and buy goods mostly because they have faith in the credibility of live streamers (Wongkitrungrueng et al., 2020) or are drawn to their attractiveness (Cai et al., 2018; Xu et al., 2020). The case of Li Jiaqi demonstrates that a live streamer can act as an endorser in the context of live streaming e-commerce.

However, the existing studies have mentioned the live streamer as an outcome related variable affecting customers' commitment, tie strength and trust (Hu et al., 2020; Kang et al., 2021; Cai and Yvette Wohn, 2019; Chen et al., 2017), they have not explored the role of live streamers in depth. Therefore, in this study, I adapted the Source Models for celebrity endorse effectiveness and scale a live streamer from two perspectives: source credibility (credibility of live streamer) and source attractiveness (attractiveness of live streamer).

Second, with the implementation of live streaming technology into e-commerce, there is a greater opportunity for live streamers to provide customers with a more social, real-time, and reality-based information sharing experience within an interactive virtual world (Sun et al., 2019). Consequently, the live streamer gradually established a reputation as a credible source, attracting followers and fans. As a result, it gives live streamers more opportunities to attract and persuade customers to participate in live streaming activities. Customers, for example, can make more informed purchase decisions due to improved information quality from the live streamers (such as product information, product show and shopping guidance), since information is in the form of real-time videos in the streaming commerce environment, which considerably differs from traditional online shopping, where customers can only receive information through pictures and text (Wongkitrungrueng and Assarut, 2020). Furthermore, rather than displaying images and recorded videos, live streamers can present them in real-time, allowing them to reveal their identities (Wongkitrungrueng and Assarut, 2020), providing customers with closeness and intimacy. It means that live streamers not only facilitate great closeness and a trustable climate among the online community, resulting in a positive effect on customer engagement, but they also generate a type of supportive behavior, which can encourage customers to join the live streaming activities as well. Third, being part of a community and engaging emotionally with other members are

fundamental human needs. From this point, live streaming platforms constructs provide much more strong interaction and intensive emotional feelings among the group than any other online shopping experience. Cases from Li Jiaqi, "We're starting now!" he claps and proclaims loudly before starting the daily live streaming activity, as millions of followers and ardent fans pour in to see him try lipsticks. When he says "OMG! Sisters, buy this!" the message is so straightforward that girls who adore beauty cannot help buying. The terms "WE" "SISTERS" evoked strong group emotional support, such as belongings, love, and empathy. Due to the enthusiastic environment and high participation in the live streaming platform, customers' emotions may be extensively aroused. Moreover, adequate real-time and information exchange in live streaming platforms on the other hand can provide a more reliable understanding, assisting customers in avoiding variation and inaccurate outcomes (Kang et al., 2021). Therefore, in order to better understand customers' need for community, I adapt the concept of social support (from two dimensions: informational and emotional support) which has been widely investigated in social commerce (s-commerce) and relation market(Liang et al., 2011; Hajli,2014; Zhang et al., 2014; Chen and Shen, 2015) into live streaming e-commerce context.

Live streaming e-commerce is still in its infancy and little scholarship exists (Hu et al. 2017), and much more research is needed to understand the perspective of new live streaming business models. Especially, studies on live streamers' contributions to live streaming e-commerce are still not enough. Base on the above, this study intends to answer the following three questions: (1) social support (from informational and emotional) positively related to customer engagement? (2)Does attractiveness and credibility of live streamer influence customer engagement? (3) Does the attractiveness and credibility of live streamer positively related to social support? (4) How does social support (from informational and emotional), as a mediating factor, affect the celebrity live streamer endorser effectiveness on customer engagement?

2. Background

2.1 What is live streaming e-commerce?

Live streaming is a kind of new technology that allows people to watch, create, and share videos in real time without first recording and storing them. It is a type of online communication and transmission format that allows users to create, release, and watch videos at the same time over the internet. Live streaming e-commerce is the product of the two-way convergence of live streaming and e-commerce in the Digital Era (360Kr Research 2020), it temporarily gathers customers and sells products while live streaming activities are taking place (Wang, 2017). Currently, it can be realized in two ways: (the focus of this paper) live streaming is embedded into e-commerce (such as Taobao, JD, VIP, Sunning, etc.) or e-commerce is integrated into live streaming (such as Douyi, Kuaishou, Mougujie, Xiaohongshu, etc.) It creates a scene of frequent and intense interaction between live streamers and customers. Figure 1-3 depicts two top live streamers (Li Jiaqi and Viya) conducting a product show in a live streaming room.



Figure 1: Screenshot of a live streaming on an e-commerce app

Figure 1 shows “King of Lipstick”, Li Jiaqi, demonstrating a lipstick shown in the live streaming room. During the live streaming activities, he was showing viewers different colors of lipsticks and trying on his own lip at the same time. He also expressed his delight, saying, "It's fantastic!" "What a beauty!" "Come on! Beauties! Sisters!" "Buy it! Buy it!" in order to elicit sympathy from the audience. In addition, he drew the lipsticks' colors on his arm to make a comparison. It is unusual for a man to act as a lipstick expert in a field dominated by women; however, it implies that professionalism and the ways how the live streamer presents the products are critical in this new business model.



Figure 2: Screenshot of live streaming on an e-commerce app

Figure 2 is a live streaming screenshot from another lipstick show session of Li Jiaqi. The

audience's comments is represented by the slide in the lower left corner of the screen. In the comments, the audience praised the color of the product and asked him the color code of the lipstick. Li Jiaqi simply wrote the code of the lipsticks on his assistant's arm in response to these requirements.



Figure 3: Screenshot of a live streaming on an e-commerce app

Viya is another top streamer who has more than 80.9 million fans and followers in TAOBAO Live. She rose to prominence after professionally selling a rocket launch for around 40 million Yuan (\$5.6 million). However, as a live streaming queen, she could sell anything (Bloomberg BusinessWeek, 2020). Figure 3 depicts her conducting food product sales in a live streaming room. In front of the screen, she and her assistant try the sauce with the noodle and give the comment. A large screen behind them displays the product's brand and price. On the lower-left of the screen, there is a link that will take you directly to the product's purchase page. Customers, watching by the telephone without smelling it and tasting it, are simply attracted by the way how Viya demonstrates the food, giving the impression that it tastes as good as it looks.

The main difference between live streaming e-commerce and e-commerce, as we can see from these two cases is that the audiences can interact with the live streamers online in real-time and comment on products at the same time. Moreover, we can see how a live streamer behaves differently depending on the product during the product demonstrations.

2.2 Live streaming e-commerce in general

Undoubtedly, live streaming has gone viral in modern China. Spurred by China's 'quarantine economy', it created new growth opportunities for a wide range of businesses and injected new impetus into the Chinese digital economy. In fact, it has become a key means for brands to gain awareness and boost sales. In less than five years, it has not only transformed people's modern lifestyles into a completely new normal, but also reshaped the retail industry and established itself as a major sales channel (Mckinsey, 2021). Therefore, in this sector, I'd like to talk about the current state of live streaming e-commerce in China.

2.2.1 The present situation of live streaming e-commerce in China

First, China's mature live streaming users have increased in the last six years. According to the most recent report from the China Internet Network Information Center³ (CNNIC) (2020), the number of live streaming users in China had reached 562.30 million, an increase of 2.48 million from March 2020, accounting for 59.8 percent of all Internet users (Figure 4). In particular, the user numbers for live streaming e-commerce

³ The China Internet Network Information Center, or CNNIC, based in Beijing, is the administrative agency responsible for domain registry affairs of. CNNIC under the Cyberspace Administration of China. It was founded on June 3, 1997 as a government department under the disguise of a non-profit organization. <https://www.cnnic.com.cn/>

was 309 million, an increase of 44.30 million from March 2020, accounting for 32.9 percent of all Internet users. In this regard, it indicates that live streaming e-commerce has already infiltrated people's daily lives.

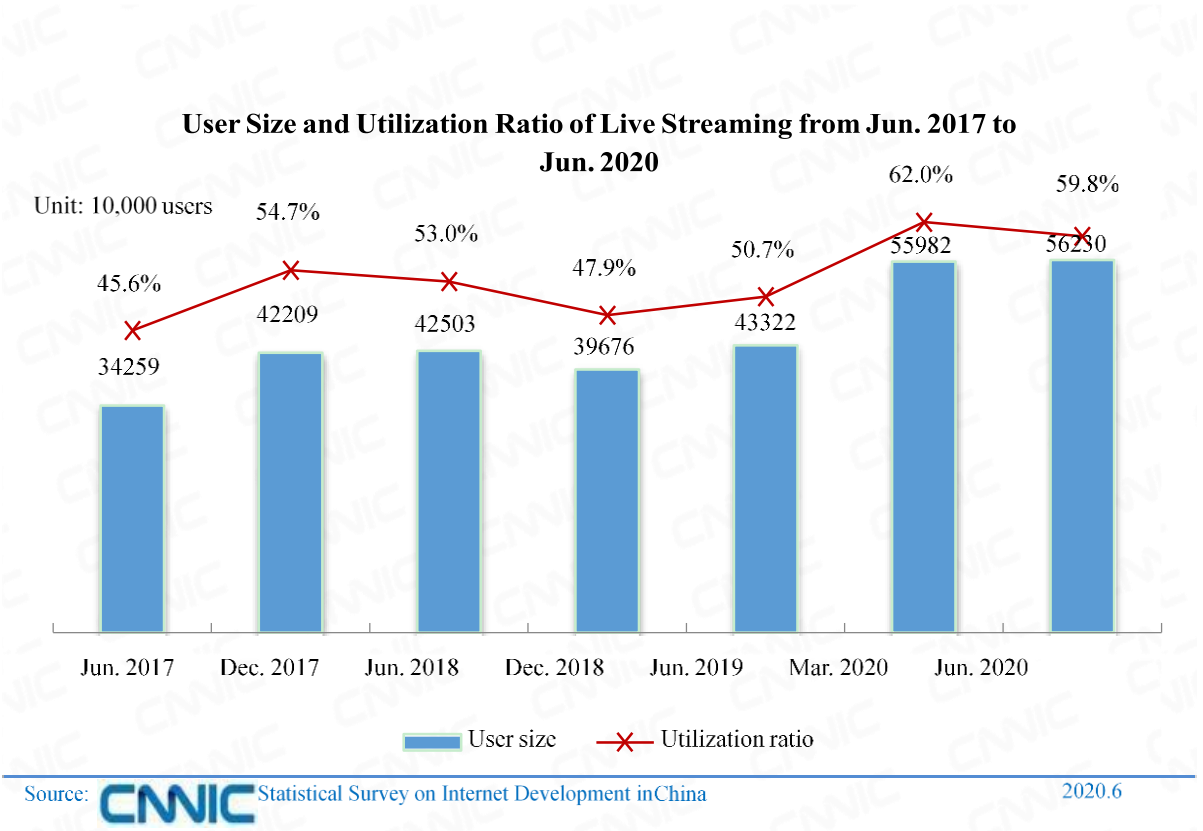


Figure 4: User Size and Utilization Ratio of Live Streaming from Jun. 2017 to Jun. 2020

Second, the main live streaming customers are young and middle- age people. This shopping style is easier to accept for tech-savvy Gen-Z and Millennial customers who are interested in new shopping formats and experiences. Some companies are seeing a 20% increase in their share of younger customers (Mckinsey, 2021). Additionally, middle age group presents a great purchase potential. In comparison to young people, the middle age group typically has a stable job and good salary. Moreover, they still like to watch the live streaming activities and make a purchase. According to Statista ⁴survey (2020), 50 percent of live streaming shoppers are between the ages of 21 and 30, and 33 percent

⁴ Statista is a German company specializing in market and consumer data. According to the company, its platform contains more than 1,000,000 statistics on more than 80,000 topics from more than 22,500 sources and 170 different industries. <https://www.statista.com/>

are between the ages of 31 and 40. The combined percentage of these two groups is 83 percent (Figure 5)! This considerable figure demonstrates that live streaming e-commerce has a very strong group identity and great purchase potential. Therefore, it is necessary to investigate this group, such as what their attitudes are toward the community.

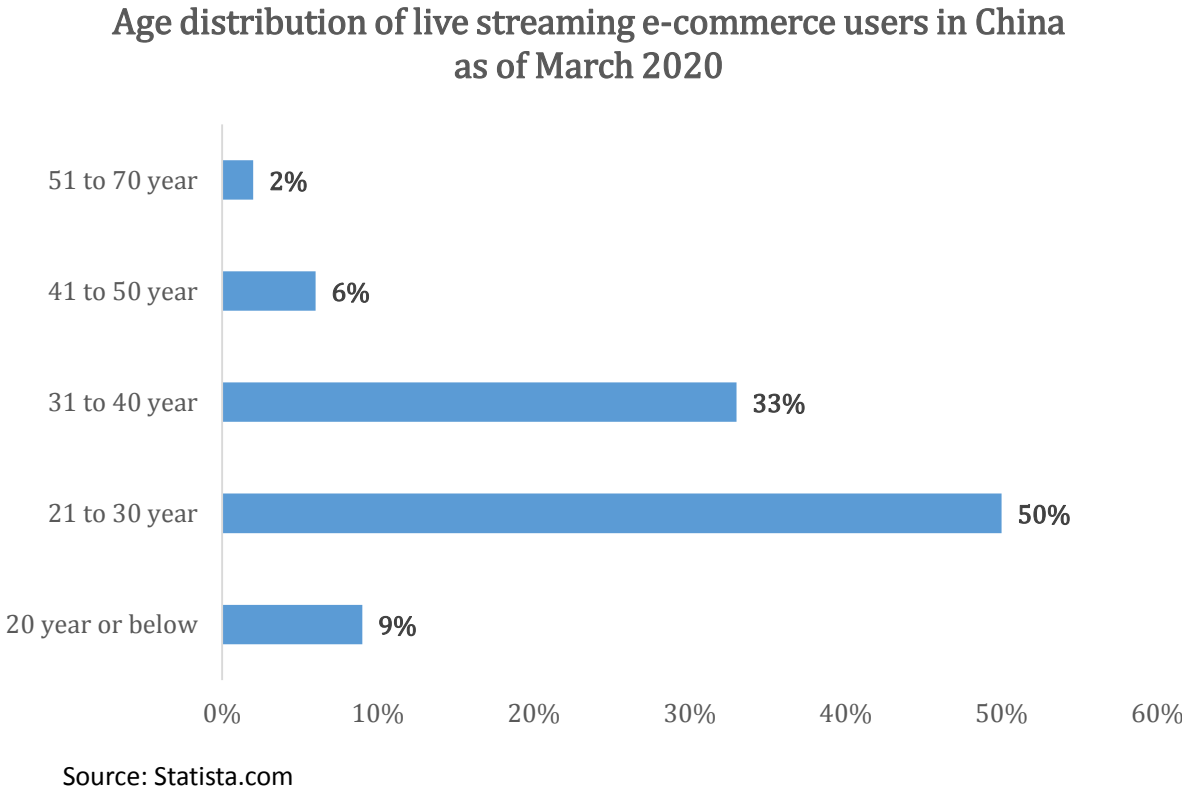


Figure 5: live streaming e-commerce users' age group in China

Technology changes life. Live streaming removes barriers between brands and customers. Live streaming e-commerce has become one of the fastest-growing Internet applications in the first half of 2020(CNNIC, 2020). It is an unstoppable trend in China's customer goods industry, with huge potential to become the norm in the future.

On the one side, according to an eMarketer report (2021), it estimates that live streaming e-commerce will generate nearly \$300 billion and grow 85 percent from the previous year. This will account for 11.7% of total retail e-commerce sales in China (Figure 6). And the optimistic forecast continues in the following years, reaching 19.4 percent in 2023.

Livestreaming Ecommerce Sales in China, 2019-2023

billions, % change, and % of total retail sales

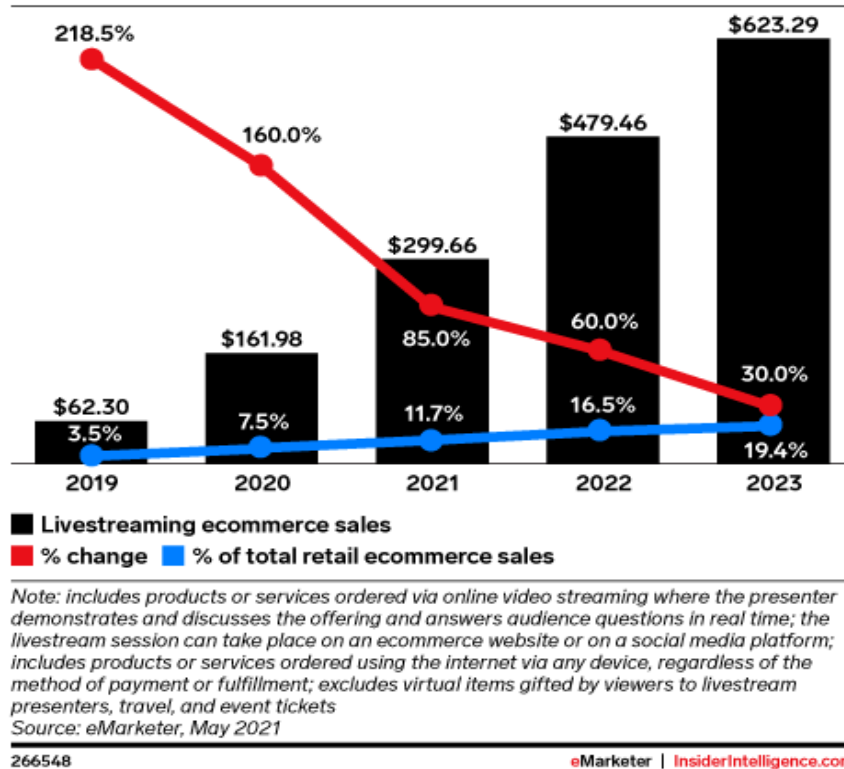


Figure 6: Live streaming e-commerce sale in China 2019-2023

On the other side, according to Statista (2020), the gross merchandise value⁵ (GMV) of e-commerce live streaming in China accounted for 4.5 percent of total online shopping's GMV in 2019 (Figure 7). Optimistically, the proportion is expected to rise to 20.3% by 2022.

⁵ Gross merchandise value (GMV) is the total value of merchandise sold over a given period of time through a [customer-to-customer](https://www.investopedia.com/terms/g/gross-merchandise-value.asp) (C2C) exchange site. It is a measure of the growth of the business or use of the site to sell merchandise owned by others. <https://www.investopedia.com/terms/g/gross-merchandise-value.asp>

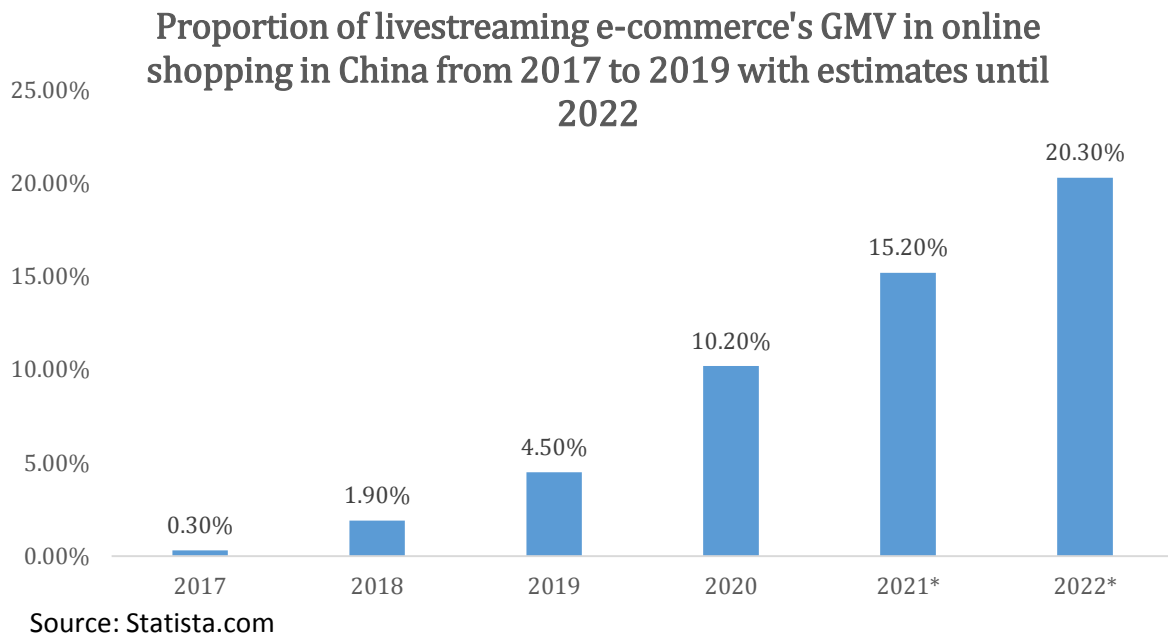
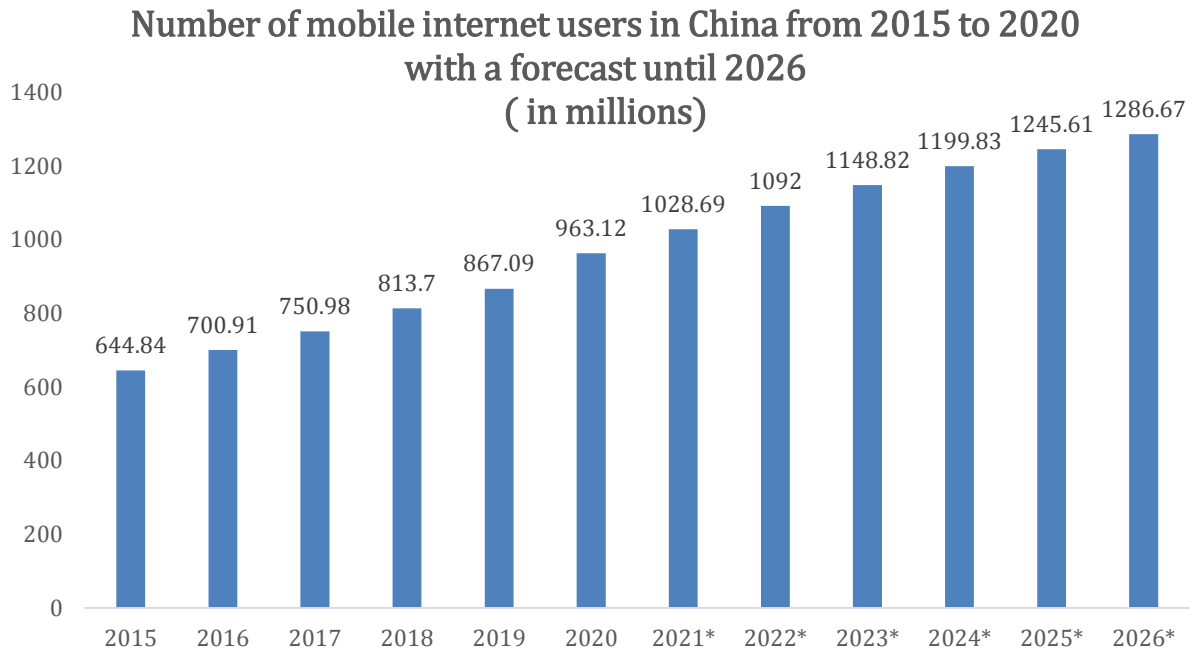


Figure 7: Proportion of live streaming e-commerce's GMV in online shopping in China 2017-2022

2.2.2 Mobile e-commerce and mobile payment

China's whole digital scene is mobile dominated. The survey respondents in this study all watched live streaming on their phones. The combination of live streaming and e-commerce has promoted the development of mobile e-commerce, which in turn has accelerated the popularity of live streaming e-commerce. In particular, in the aftermath of the coronavirus pandemic, mobile has shaped a new shopping style, with an increasing number of Chinese people accessing the internet via mobile and shopping via live streaming (CNBC, 2021). Figure 8 shows that over 963 million Chinese people used their mobile phones to access the internet in 2020, and it is expected to reach 1 billion in the next five years (Statista, 2021).



Source: Statista.com

Figure 8: Number of mobile internet users in China from 2015 to 2020 with a forecast until 2026

Moreover, the convenience and security of mobile payment paves the way for the growth of live streaming e-commerce. Customers can watch live streaming and purchase products over the phone at any time and from any location. According to the research firm eMarketer, 79% of Chinese smartphone users made a mobile point-of-sale purchase in 2020, which means that more than 3/4 of China smartphone users use mobile payment. It is expected to reach 62.4 million mobile payment users by 2021(Figure 9).

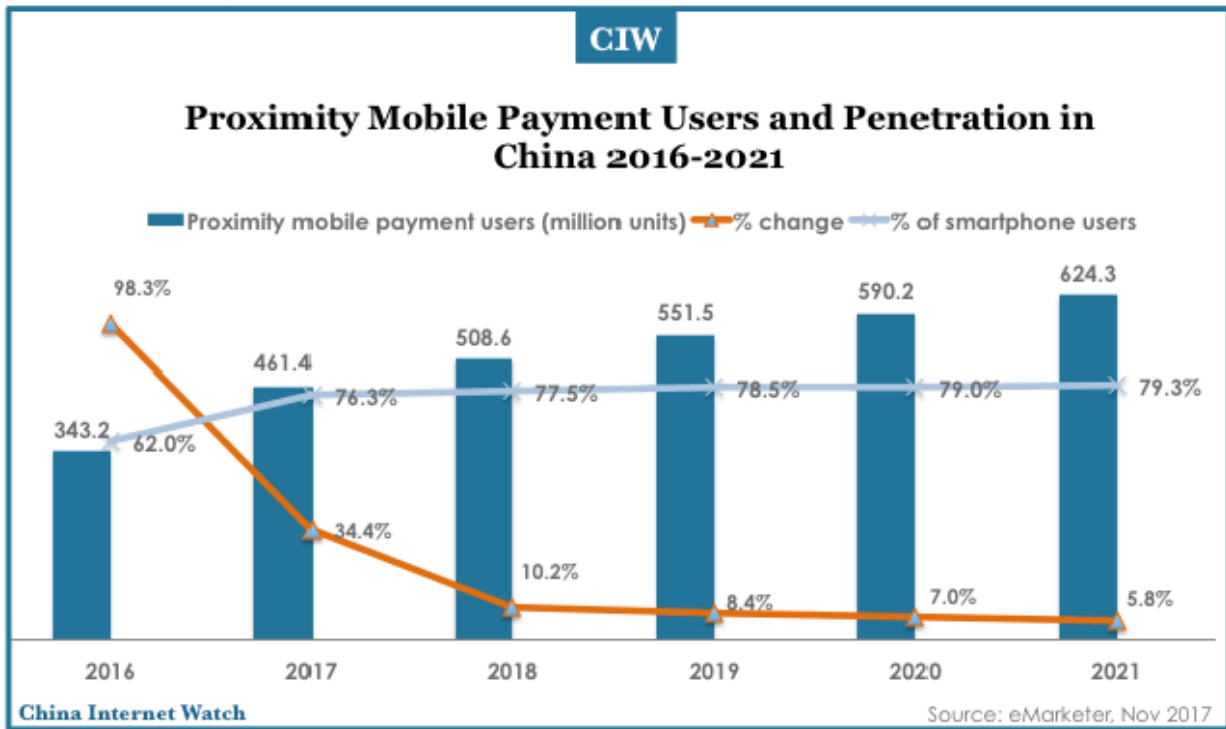


Figure 9: Mobile payment users and penetration in China 2016-2021

2.2.3 Regulations in the live streaming market

Live streaming e-commerce has become essential to marketing in China; however, this industry has seen an increase in misbehavior by some live streamers, false advertisements, and counterfeit goods. There are over 400,000 live streamers active in the industry and attract over 50 billion views (CINNC, 2020). Additionally, customers' purchases are influenced not only by their needs but also by their affection for and trust in top live streamers, who have a large number of followers (XINHUANET, 2020). Top live streamers, for example, Li Jiaqi and Viya, who have millions of fans, could have a huge negative impact on the live streaming market if they sell counterfeit goods or misbehave during the live streaming activities. However, due to the live streaming market involves many participants, making it difficult to define responsibility among the players.

Finally, the Cyberspace Administration of China ⁶(CAC) issued new guidelines to

⁶ It is the central Internet regulator, censor, oversight, and control agency for the People's Republic of China.

regulate the live streaming industry, which have been regarded as a regulatory signal to regulate the live streaming market and were set to implement on May 25, 2021. The regulation states that the live streaming platforms are obligated to sign an agreement with the live streaming channel operator, requiring them to standardize the recruitment, training, and management process of live streamers marketing personnel, as well as to ensure the authenticity and legitimacy of live broadcast marketing content, goods, and services. Additionally, live streamers must provide their real names as well as their social credit codes to the live streaming marketing platforms that they use. Live streamers must also be at least 16 years old unless they are under the supervision of an adult.

From the efforts did by the Chinese government to regulate the live streaming market, we can see that this industry is becoming increasingly important from an economic standpoint. Especially, live streamers play such an important role that authorities try to make them more trustable through setting the regulations.

2.3 Live streamer

As previously stated, live streamers play a very vital role in this industry that regulations have been set up to ensure their legitimacy. And it is important to be understood in the Chinese context.

In general, a live streamer is a person who live streams themselves online through a live stream, either playing video games as a hobby or profession as impact on promoting and has an ability to influence viewers' attitudes and motivations (Sjöblom and Hamari, 2016; Woodcock and Johnson, 2019). Live streamer in this study is a person who is famous on the live streaming e-commerce platform and has an impact on promoting products and sales (Cai et al., 2018; Sun et al., 2019; Zhou et al., 2019; Wongkitrungrueng and Assarut, 2020). The super-popular live streamers in China are represented by Viya and Li Jiaqi,

redefining China's e-commerce and new retail industry (SEOAGENCYCHINA⁷, 2020). During the "11.11 Global Shopping Festival"⁸ in 2020, according to Chinese media reports, Li Jiaqi's latest achievement was 600 million US dollars, while Vi Ya and Kim Kardashian, an American super star, connected via Vi Ya's live-streaming channel in Taobao Live platform and helped her sold 15,000 bottles of her own brand perfume. Gradually, these top live streamers acquired a new name that attempts to distinguish them from other live streamers: key opinion leaders (KOLs).

KOLs have been extensively researched in the fields of politics, psychology, marketing & fashion marketing, and social media, and so on (e.g. Ronald S. Burt, 1990; Chan and Misra, 1990; Zhang and Lee, 2013; Jain and Katarya, 2018; Guo et al., 2021). They normally are recognized as a minority of active interpersonal communication networks, usually providing objective information on certain aspects and having a certain degree of influence, influencing the majority's attitudes (Ronald S. Burt, 1990; Guo et al., 2021). What we can see from the cases I mentioned, a live streamer as an individual (such as Viya or Li Jiaqi) could engage millions of viewers and sell for hundreds of millions of dollars; there is no doubt that they truly have the ability to influence the majority's attitudes as well as KOLs. To some extent, it is reasonable to call them KOLs (Guo et al., 2021).

In addition to these super popular live streamers who earn this title, there are many other well-known live streamers who also have huge fans and followers and could generate great profits as well (Figure 10), but they are not recognized as KOLs.

⁷ SEO Agency China is a sub-division of GMA made of 15 experts in their field. GMA Network is a Philippine free-to-air television and radio network. It is the flagship property of publicly traded GMA Network, Inc.

⁸ 11.11 Global Shopping Festival encompasses all of the company's Singles' Day activities. According to legend, Singles' Day was invented by a group of Chinese university students as an anti-Valentine's day when single people would treat themselves to gifts.



Figure 10: GMV of Top 10 live streamers in China from Jul. 2020 to Dec. 2020

However, there is no shortage of KOLs in e-commerce live streaming (Guo et al., 2021), who can be KOLs, celebrities, internet celebrities, fashion bloggers, or authorities. Therefore, in this study I focus on the subjective of live streamers who have harnessed the power of live streaming to sell products and services in live streaming e-commerce platforms (Kang et al., 2021; Lu et al., 2018; Chen and Lin, 2018; Chen et al., 2019; Park and Lin, 2019).

3. Literature review

3.1 From E-commerce to Live streaming e-commerce

Live streaming e-commerce is the product of the two-way convergence of live streaming and e-commerce in the Digital Era (360Kr Research 2020). It can be realized in two ways: live streaming is embedded into e-commerce or e-commerce is integrated into live streaming. As a result, it incorporated major e-commerce and special media features (Cai et al., 2018; Sun et al., 2019; Wongkitrungrueng and Assarut, 2020), introducing it as a novel method of influencing customer purchasing. These significant features have

effectively piqued the interest of academics. Almost all the previous studies have been conducted to highlight the differences between live streaming e-commerce and traditional e-commerce.

In comparison to traditional e-commerce, the distinguishing aspect of live streaming can be summarized into two features: simultaneity (Scheibe et al., 2016) and authenticity (Tang et al., 2016). Simultaneity implies that customers can communicate with sellers in real time, while authenticity presupposes a more interpersonal connection (Haimson and Tang, 2017; Wohn et al., 2018; Xu et al., 2020; Kang et al., 2020). Other researchers who are more interested in the technological aspects of live streaming platforms defined two further significant characteristics: interactivity (Zhou et al., 2019) and timeliness (Apiradee and Nuttapol, 2018). Although these perceived features have provided us with insight into live streaming e-commerce from both a social and technological perspective, it is still unclear, how the live streamers alter the layout of the shopping experience. My work aims to first extend the analysis by exploring how the elements (3P: people, place, and product) have been optimized to create this modern shopping experience.

In traditional e-commerce, products are displayed digitally through content (such as text, images, and pre-recorded videos), and platforms offer a place where customers can search for what they want. It means customers need to expend a lot of time and great effort in this method of shopping to find products based on various types of information (Xu et al., 2020). Sellers, on the other hand, play a more passive role, for instance, they sit behind the screen and upload pictures and product details to their websites and then wait for customers to visit the websites. While live streaming e-commerce, it creates a brand new place where customers can not only engage with live streamers and other peers in real-time, but also enjoy shopping benefits, such as high-quality real-time information (Kang et al., 2020). As a result, in the live streaming e-commerce context live streamers play a more active role, they sit in front of the screen and talk directly to the customers. Since products are presented by live streamers via live streaming, customers do not need to do an effort to browse websites, compare details and feedbacks. They, in fact, join the live streaming activities and simply buy the products displayed by live streamers. Figure 11 depicts the development of 3P in live streaming e-commerce as conceptualized in my

work.

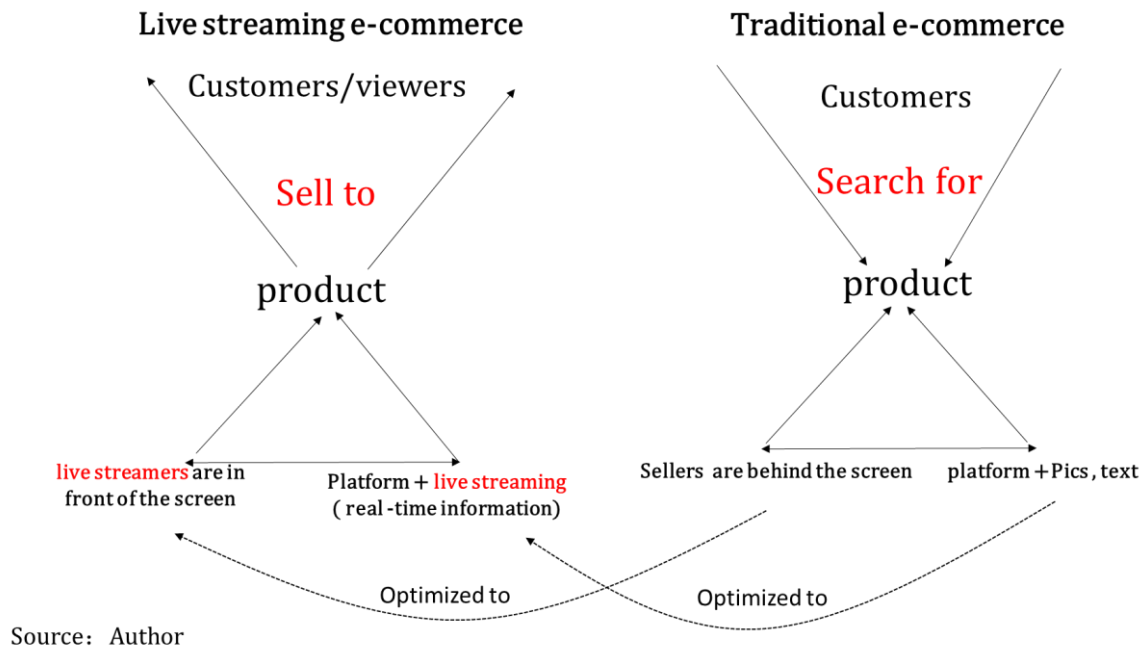


Figure 11: Live streaming e-commerce and Traditional e-commerce

Consequently, because of the reformation of people and place, a live streaming e-commerce has social, technological, or socio-technical implications. Hence, the current research focuses primarily on these three perspectives.

First, there were various studies concentrated on the effects of customer values and motivation (Wongkitrungrueng and Assarut, 2020; Cai et al., 2018) on customer engagement and purchasing intention. For example, Wongkitrungrueng et al. (2020) found that symbolic value has a significant impact on customer engagement, while utilitarian⁹ and hedonic¹⁰ values can only affect customer engagement through trust in live streamer. Similarly, Hu and Chaudhry (2020) discovered that financial bonds relating to product price can only affect customer engagement through commitment to the broadcaster however, social bonds relating to service dimensions (such as friendship,

⁹ Utilitarian value is defined as that value that a customer receives based on a task-related and rational consumption behavior (Babin et al. 1994)

¹⁰ Hedonic value is defined as that value a customer receives based on the subject experience of fun and playfulness (Babin et al. 1994).

interpersonal interaction, and identification) and structural bonds correlated with value-added services (e.g. suggestions about how to mix- and- match the clothes) have a positive direct impact on customer engagement. Additionally, Cai and Whon (2019) found that hedonic and utilitarian motivation have a positive impact on celebrity-based intention and product-based intention, respectively. These findings imply that live streamers have the ability to transfer values among groups and increase customer motivation. Customers, in fact, are more likely to concern with the perceived value between themselves and live streamers than with the functionality provided by goods.

Second, other scholars who hold a technical perspective focus primarily on the constructions of the platform, they consider the live streaming platform as an electronic interactive platform (Cai and Wohn, 2019; Kang et al., 2021; Li et al., 2021), where businesses and customers can collaborate to create value (Hu et al; 2017). Based on a large amount of real-time customer data, Li et al. (2021) discovered that interactivity (responsiveness and personalization) in the live streaming community can be both advantageous and problematic for customer's engagement which suggests that social influence can lead to customer defection (Nitzan and Libai, 2011). The number and frequency of responses from live streamers, in particular, are critical (Li et al., 2021).

Third, as social platforms carry more social manifestations (Goraya et al., 2019) in addition to their technical nature, a live streaming shopping platform can also be regarded as a social technology platform (Sun et al., 2019; Li et al., 2021), and as a result, some researchers adopt a socio-technical approach to study customer behaviors (Hu et al., 2016; Sun et al., 2019; Wan et al., 2017; Li et al., 2021). For example, Li et al. (2021) investigated user stickiness using attachment theory and found that platform attachment has a greater effect on user stickiness than an emotional attachment to live streamers.

Table1: Key articles and findings

Key articles	Method	Country	Sample size	Independent Variables	Dependent Variables	Key findings
Cai et al. (2018)	survey	American	220	hedonic motivations; utilitarian motivations	shopping intention	Hedonic motivation is positively related to celebrity-based intention, while utilitarian motivation is positively related to product-based intention.
Hu and Chaudhry, (2020)	survey	China	327	financial bonds; social bonds; structural bonds	affective commitment; consumer engagement	Social and structural bonds positively affect consumer engagement directly and indirectly via affective commitment, however financial bonds have only an indirect effect via affective commitment on consumer engagement.
Wongkitrungrueng and Assarut, (2020)	survey	Thailand	261	Symbolic value; utilitarian value; hedonic values	trust; consumer engagement	Symbolic value has a direct and indirect effect via trust in sellers on customer engagement, while utilitarian and hedonic values are shown to affect customer engagement indirectly through customer trust in products and trust in sellers sequentially.
Cai and Whon, (2019)	survey	American	220	enjoyment of interaction; substitutability of personal examination; need for community; trend setting	customer motivations and behavioral intentions in three different scenarios	Substitutability of personal examination was associated with the general watching scenario and product search scenario, while enjoyment of interaction was associated with the internet celebrity scenario. Trend setting was associated with all scenarios but need for community was insignificant with all scenarios.
Kang et al. (2021)	real-time online data	China	3,500,445	interactivity; moderating role: Tenure of membership; Popularity	tie strength; customer engagement behavior	Interactivity has a curvilinear relationship with customer engagement behavior. Besides, tie strength plays an intermediary role between interactivity and customer engagement behavior. Furthermore, both tenure of membership and popularity have an important moderating relationship between interactivity and tie strength.
Sun et al. (2019)	survey	China	510	visibility affordance; met voicing affordance; guidance shopping affordance	customer engagement; purchase intention	Visibility affordance, met voicing affordance, and guidance shopping affordance can influence customer purchase intention through live streaming engagement.
Park and Lin, (2020)	survey	China	252	product-source fit; product content fit; source attractiveness; source trustworthiness	purchase intention	Product-source fit affects the perceived source attractiveness and trustworthiness, while product content fit affects utilitarian and hedonic attitude toward the content. Source trustworthiness, hedonic attitude and self-product fit increased the intention to buy, while source attractiveness failed to influence purchase intention.
Wongkitrungrueng et al. (2020)	A mixed quantitative and qualitative approach	Thailand		Transaction-based approach; Persuasion-based approach; Content-based approach; Relationship-based approach; entertaining; Opinion leaders	relationship mechanisms	A transaction- and persuasion-based approach can help build customer relationships in the short run while a content- and relationship-based approach can help retain customers in the long run.
Guo et al. (2021)	survey	China	512	intermediate variables: trust; perceived functional value; perceived emotional value;	purchase intentions	opinion leader and entertainment positively affect trust, perceived functional value and perceived emotional value. All the intermediate variables are positive on customer purchase intentions

Currently, research on live streaming commerce is limited (Cai et al., 2018; Sun et al., 2019;

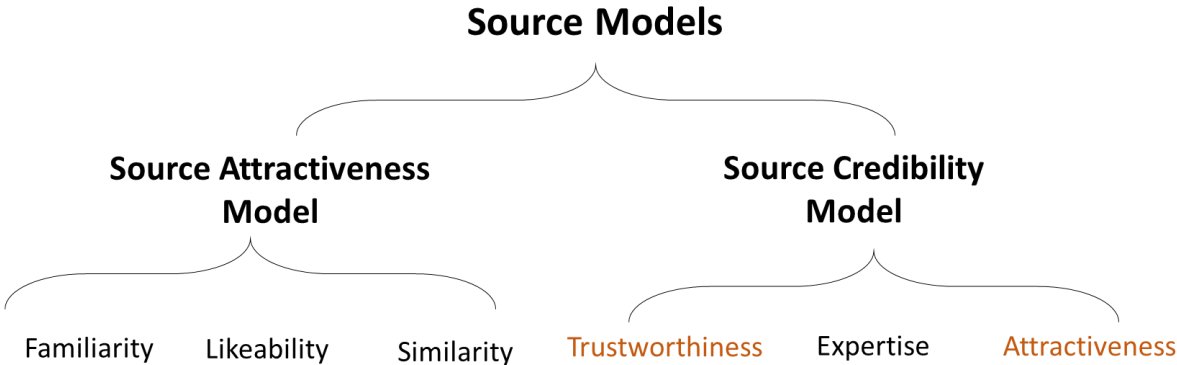
Wongkitrungrueng and Assarut, 2020). Table 1 summaries of the key articles and key findings in live streaming e-commerce. First, we can see that most of the articles focus on the customer's perspective, despite the fact that almost all of these papers emphasize the importance of live streamers. Moreover, there is also some concern about the live streaming e-commerce community. In fact, since live streamers are equipped with live streaming technology, they empower the interaction among the customers, and they can greatly transfer the social and technical features to the customers among the online community. Hence, I assume that live streaming e-commerce is a type of e-commerce that integrates real-time social interaction and involves a live streamer to achieve marketing goals via a live streaming platform in this study. Furthermore, I would like to investigate the live streaming e-commerce community from different perspectives as well.

3.2 Live streamer characteristics and endorser effectiveness

Live streamers became more and more important in the Chinese live streaming e-commerce industry. They act as a human attraction by offering a wide range of information and introducing new shopping trends based on the trust developed through continual interaction with followers or fans (Park and Lin, 2019; Hu and Chaudhry, 2020; Kang et al., 2021). In this way, they play such a crucial role during the sale campaigns on live streaming e-commerce platforms. However, only limited research has paid attention to live streamers (e.g. Wongkitrungrueng et al., 2020; Park and Lin, 2019; Gao et al., 2021). For example, Wongkitrungrueng et al. (2020) conducted a quantitative analysis focused on the seller's (live streamer) perspective and found that different sales approaches would attract and retain customers in the short and long run time. Nonetheless, they concentrate primarily on how seller's (live streamer) tactics affect customer behavior, leaving the live streamer as an individual factor unexplored.

However, previous studies have explored live streamers as a latent variable (Park and Lin, 2020; Guo et al., 2021). They examined purchase intention applying the concept of Source Models for celebrity endorsement effectiveness. Source Models represents one domain of

explanations for the effect of celebrity endorser on attitudes and purchase intention, including the Source credibility model (Hovland et al., 1953; Hovland and Weiss, 1951) and Source attractiveness model (McGuire, 1985). The source credibility model concluded three variables, expertise, trustworthiness and attractiveness. Source-attractiveness model scaled by familiarity, likability, and similarity. Figure 10 shows the structure of Source models. Therefore, according to the Source Models, the source trustworthiness, and source attractiveness applied in their studies are only two dimensions of source credibility (marked in orange in Figure12).



Source: Hovland et. al., 1953; McGuire, 1985

Figure 12: Source Models for celebrity endorser effectiveness

The live streamer, however, possesses more than these two characteristics. Considering that those live streamers always present as experts as well as other characteristics, the Source Models for celebrity endorse effectiveness can be fully applied to live streamers. Because:

First, the role of a celebrity endorser and a live streamer is comparable. The existing studies described live streamers as usually presenting product information while adding their own user experience and critical feedback (Chen and Lin, 2018) and influencing customer behavior (Xu et al., 2021; Hu and Chaudhry, 2020). Although they share mutual characteristics, unlike traditional endorsers, live streamers equipped with live streaming technology can conduct product shows or instruction shopping (Li et al., 2021) to

demonstrate how to use products and fully display them in response to customer requests (Lu et al., 2018; Wongkitrungrueng and Assarut, 2020). In fact, this distinction can be considered as a significant advantage that opens up more opportunities for anyone who intends to be a celebrity endorser in this business model.

Second, the benefits of a celebrity endorser and a live streamer are analogous. The usage of celebrity endorsement effectiveness can help a company in differentiating their products and has a significant impact on brand perceptions (Kamins et al., 1989; Till et al., 2008), as well as brand loyalty (Spry et al., 2011). A celebrity with the reputation of an expert, in particular, has been found to be more persuasive (Aaker and Myers, 1987) in increasing the credibility of advertisements (Kamins et al., 1989) and generating more purchasing intentions (Ohanian, 1991). Likewise, live streamers in live streaming e-commerce who are product experts can provide correct information to prevent marketers' failure (Chen et al., 2019), thus gaining a reputation as a trustworthy source and attracting a mass of followers and fans (Xu et al., 2021). Moreover, an attractive live streamer may persuade viewers to consider his or her suggestions, facilitating customer purchasing decisions as well (Xu et al., 2021). Customers are more likely to join the platform if they perceive live streamers to be familiar, likable, and similar. As a result, many companies are willing to pay large commissions to the live streamers who are already famous in order to sell goods and market their brands. According to the discussion above, under certain conditions, a live streamer can be considered as an endorser and have endorser effectiveness in this business model.

As the online marketplace becomes more competitive and cramped (Cunningham et al., 2019), the action for customer engagement and purchase intention has become increasingly intense. However, only a few live streamers can become well-known and gain popularity by having millions of followers and fans. In this study, I focus on live streamers who have reached a certain level of popularity, and hence they can have the same kind of effect as a celebrity endorser (Chen and Lin, 2018). This indicates that a top live streamer with millions of followers has the ability to influence viewers' attitudes and is more likely to transfer information and emotion than peers, thereby strengthening the effect of supportive behaviors in the community. Accordingly, I defined celebrity live streamer

endorser effectiveness as the ability of the celebrity live streamer to create live streaming activities to encourage viewers to participate in live streaming platforms, as well as to persuade viewers to agree with their behavior or attitude and, as a result, willing to accept their opinion or recommendations.

Overall, based on previous studies(Park and Lin, 2020;Gao et al., 2021) and considered the role of live streamers in live streaming e-commerce, I'd like to investigate live streamers by fully adapting the Source Credibility Model and Source Attractiveness Model in order to better predict customer behavior in the live streaming e-commerce domain. Therefore, I assume that the level of source credibility and attractiveness of live streamers can influence customer attitude and behavior in this study.

3.3 Social support in the live streaming e-commerce community

Cobb (1976) defines social support as "information leading the subject to believe that he is cared for and respected, esteemed, and a part of a network of shared obligations". Since social support is viewed as a multidimensional construct, the components of which can vary depending on the context (Nora Madjar, 2008; Xie Bo, 2008;Huang et al., 2010), it has been studied across a wide range of disciplines including psychology, communications, medicine, sociology, nursing, education, and social work (Cobb, 1976; Kessler et al., 1985; Berkman and Glass, 2000). Previous studies in the field of s-commerce context successfully have applied the concept of social support (emotional support and informational support) to examine the s-commerce community, discovering it has a substantial effect on customers' decisions about social commerce intention (Liang et al., 2011; M. Nick Hajli, 2014; Zhang et al., 2014; Chen and Shen, 2015). The most recent study by Molinillo et al. (2020) is one of these, and it has contributed to proving social support has a positive impact on customer engagement. However, it has not been studied yet in live streaming e-commerce community.

In comparison to s-commerce, live streaming technology allows all the participants to

interact with each other. The live streaming e-commerce community has become an important platform for live streamers to promote their products and cultivate fans. For customers, also like to share information with the networked community through word of mouth. In this regard, live streaming e-commerce is an appropriate setting for applying social support theory.

First, live streaming e-commerce platform enables viewers not only to consume but also, engage with live streamers and peers during live streaming activities, in turn resulting in a sense of intimacy and proximity (Hilvert-Bruce et al., 2018; Hu and Chaudhry, 2020; Kang et al., 2021) among the community. For example, it contributes to developing a range of feelings and conditions such as a sense of belonging and motivation (Luo et al., 2016; Apiradee and Nuttapol, 2018; Kang et al., 2020; Wongkitrungrueng and Assarut, 2020), instrumental assistance (Wohn et al., 2018), and friendships (Parks and Floyd, 1995; Rosson, 1999; Ridings and Gefen, 2004; Li et al., 2021) that provide to viewers a kind of emotional support. When customers perceive that other members have been caring and helpful in providing useful information, then acquiring or sharing valuable shopping information with others would be obligatory.

Second, live streaming technology is based on the presentation of goods in real-time videos, permits to provide customers with more detailed and trustable product information (Wongkitrungrueng and Assarut, 2020; Kang et al., 2021; Sun et al., 2019; Li et al., 2021). For instance, the live streaming e-commerce community provides a diverse range of user experiences from peers and live streamers and generating greater motivation to facilitate consumption behaviors (Yu et al., 2018; Cai et al., 2018; Kang et al., 2020) and social values (Eastin and LaRose, 2005; Xie Bo, 2008; Obst and Stafurik, 2010; Wongkitrungrueng and Assarut, 2020).

Third, live streamers typically present products by combining their own experience (Chen and Lin, 2018) have a higher purchasing persuasiveness. In this sense, it reveals that get quantified informational support (Wellman et al., 1996; Wongkitrungrueng and Assarut, 2020; Lu et al., 2018; Kang et al., 2021) from trustable live streamers is another important factor that encourages people to join the online community. Therefore, people who have received social support, whether from live streamers or a group, are highly motivated to

participate in live streaming activities.

Although previous studies (Cai and Wohn, 2019) has tried to explore live streaming e-commerce community. They did examine it from different aspects of the need for community. Therefore, it is necessary to categories customers' motivations in order to understand it better. Informational support tends to provide solutions and information directly, whereas emotional support aids in indirect solving problems by focusing on expressing one's concerns (Liang et al., 2011). I believe that social support could provide a new perspective on live streaming e-commerce community.

Finally, I would like to adopt the definition of informational support and emotional support from Liang et al. (2011). Informational support refers to providing messages, in the form of recommendations, advice, or knowledge that could be helpful for solving problems, while emotional support refers to providing messages that involve emotional concerns such as caring, understanding, or empathy.

4. Hypotheses development

In this section, I present logical arguments to support the hypothetical assumption sets that are devised among selected latent variables, namely, social support(from informational support and emotional support), celebrity live streamer endorser effectiveness (from the attractiveness of live streamer and credibility of live streamer), and customer engagement. Fig.13 depicts the research model.

4.1 Celebrity live streamer endorser effectiveness

4.1.1 Attractiveness of live streamer effectiveness

Source attractiveness involves three characteristics: familiarity, likeability, and similarity of the source (McGuire, 1985). Familiarity is described as “the knowledge of a source through exposure” (Erdogan, 1999, p. 299), likeability refers to “Affection for the source as a result of the source’s physical appearance and behavior” (Erdogan 1999, p. 299),

and similarity defined as “The supposed resemblance between the source and the receiver of the message” (Roy, 2006 p. 141).

Many research suggests that source attractiveness has a positive impact on customer attitude, product perception, and product persuasiveness (Joseph, 1982; Ohanian, 1990). Live streamers use personal characteristics to attract viewers to engage in live streaming platforms and may help viewers in perceiving symbolic value, such as social codes, relationships, and personal identity, which has a greater influence on customer engagement (Wongkitrungrueng and Assarut, 2020). Moreover, attractiveness source can enhance the levels of customer trust (Johnson and Grayson, 2005; Ziegler and Golbeck, 2007; Wongkitrungrueng and Assarut, 2020), resulting in increased customer engagement as well.

Customers, on the other hand, are more likely to engage in a live streaming activity that can reflect and enhance their personal identities (Erdem et al., 1999; Sirgy et al., 2000). Hence, if customers perceive these values from their favored live streamers, a positive stereotype of an attractive celebrity is formed, and this positive attitude toward the live streamers can considerably motivate them to engage in their platforms. In this regard, I hypothesize that

H1: Attractiveness of live streamer is positively related to the customer engagement

Moreover, numerous studies have discovered that familiarity, likeability, and similarity can all influence an individual's perception in various ways (Baker and Churchill, 1977; Moreland and Zajonc, 1982). For example, we feel attracted toward those who are similar, familiarity or likeability to ourselves (Byrne et al., 1971; Griffitt et al., 1972), because they could provide solid affirmation for our perception, such as values, attitudes, and beliefs (Byrne and Clore, 1970). Accordingly, it may provide a sense of belonging and understanding to satisfy one's emotional needs.

Live streaming e-commerce provides a range of opportunities for viewers to communicate and socialize with a live streamer (Hu et al., 2017). Using live streaming technology, live streamers are likely to develop an emotional connection with viewers by creating the impression of being physically present. Moreover, during live streaming

activities, live streamers typically introduce their backgrounds and identities to customers in order to gain their trust; on the other hand, customers expect a live streamer who exposes himself or herself to the public to be less likely to commit fraud (Wongkitrungrueng and Assarut, 2020).

Therefore, attractiveness of live streamer is more likely to generate emotional support which would contribute to a better understanding of the viewers' emotional needs, reducing uncertainties, and concerns, bringing warmth and supportive assistant and increasing the probability of supporting behaviors during the online purchase process. Therefore, I propose:

H2: Attractiveness of liver streamer is positively related to the emotional support

4.1.2 Credibility of live streamer effectiveness

Source credibility is embodied three aspects: expertise, trustworthiness , and attractiveness (McGuire, 1985). Expertise is defined as the extent to which a communicator with knowledge, experience, or abilities is seen as a source of valid assertions (Erdogan, 1999). Trustworthiness, which reflects an information provider's ethical characteristics (e.g., honesty, integrity, and belief worthiness), ensures that this individual offers reliable information (Erdogan, 1999; Sussman and Sieg ,2003).

Attractiveness, as a component of the credibility construct (Ohanian, 1990) refers to an individual with a physically attractive appearance as well as other characteristics (Erdogan, 1999). In fact, in the context of live streaming, charming streamers can easily capture the attention of viewers (Lin and Chen, 2018), but those who are not physically appealing can also get millions of fans. Therefore, I believe that attractiveness combined with multiple characteristics can better assess the credibility of live streamers, attracting customers to join the live streaming activities.

Additionally, source credibility also refers to the extent to which an information source is perceived to be believable, proficient and trustworthy by information recipients (Petty et al., 1981; Goldberg and Hartwick, 1990; Sussman and Siegal, 2003). Previous

studies have found perceived expertise and trustworthiness (Goldberg and Hartwick, 1990; Hovland et al., 1953; Willemsen et al., 2012) can influence customer behaviors such as attitudes toward the brand and behavioral intention (Homer and Kahle, 1990; Gong and Li, 2017). In contrast to internet celebrities, who do not need to be viewed as experts or information sources for customers to assess the level of source credibility (Park and Lin, 2020), because the majority of endorsed brands or products are already well-known, most live streamers endorsing unknown brands or products, and they must make an effort to maintain the quality of their information in order to get customers trustworthiness.

Therefore, I assume that the credibility of live streamer can have a significant impact on customers' enthusiasm to participate in platforms. Hence, I have the following hypothesis:

H3: Credibility of live streamer is positively related to the customer engagement

Moreover, many studies have shown that information from a credible source can influence people's perceptions, such as beliefs, opinions, and attitudes (Erdogan, 1999; Priester and Petty, 2003; Sussman and Sieg, 2003), resulting in strengthening the informational support. Attractiveness is another dimension in source credibility that was associated with personality and social skills (Sarason et al., 1985) in this study. For live streaming purchasing customers, the information provided by a credible live streamer is more dependable since it is based on their own experience, and it can be used to assess the value of products and services. Thus, I propose the following hypotheses:

H4: Credibility of live streamer is positively related to the informational support

4.2 Social support and customer engagement

4.2.1 Direct effects of social support

Social support is defined as an individual's involvement with others in a social commerce community and receiving cognitive information from others that may satisfy their psychological needs and enhance their well-being (Maslow, 1954; Shaw and Gant, 2002; Eastin and La Rose, 2005).

Prior research has shown that social support not only increases perceived value, customer trust, and commitment to social commerce (Liang et al., 2011; Hajli, 2014; Zhang et al., 2014; Chen and Shen, 2015), but also generates emotional aspects such as empathy, concern, love, or encouragement (Steinberg et al., 1992) and may offer problem solutions (Liang et al., 2011). Customers in the live streaming e-commerce community can post their questions, requests, and concerns on the screen and receive instant responses from live streamers or peers, giving them the impression that they are actually cared for.

Moreover, relevant and helpful information offers individuals with advice and interpretation to help them make good decisions (Liang et al., 2011; Chen and Shen 2015), resulting in increased community commitment (Sheth and Parvatiyar, 1995). Specially, Live streamers equipped with live streaming technology can approach the greatest number of customers by delivering real-time information, which significantly reduces uncertainty and risks during the purchasing process (Hu and Chaudhry, 2020). Therefore, I believe that these two dimensions of social support have a positive effect on an individual's psychological satisfaction, causing customers to feel engaged and connected. Accordingly, this research hypothesizes:

H5a: emotional support is positively related to the customer engagement

H5b: informational support is positively related to the customer engagement

4.2 .2 Social support as a mediator role

Previous research has found that social support acts as a mediator role, reducing the detrimental consequences of stress on health (Cohen and Wills, 1985; Thoits, 1995). For example, when people face stress, those with more individual or community resources are more likely than those with no resources to safeguard against the negative physiological consequences of stress and depression (Cohen and Wills, 1985; Christian and Stoney, 2006). A popular live streamer with millions of followers, such as Li Jiaqi or Viya, can enhance the level of social support; for example, information from them would be welcomed, and caring from them would be appreciated. Thus, if a customer encounters difficulties while shopping, advice or warm caring from the live streamer can help to alleviate their anxiety.

As analyses earlier, attractiveness of live streamer is positively influenced emotional support, and emotional support positively influence the customer engagement. Celebrity of live streamer is positively influenced informational support, and informational positively influenced customer engagement. In the context of live streaming e-commerce, live streamers not only distribute their knowledge and skills to customers, but also provide emotional support to the customers. Therefore, I believe that when a live streamer presents as having a higher reputation (being more skilled, charming, or knowledgeable), it can increase the level of social support from both perspectives, which enhancing the motivation to participate in the platform. Therefore, I assume:

H6: emotional support mediates the effect of attractiveness of live streamer on customer engagement.

H7: informational support mediates the effect of credibility of live streamer on customer engagement.

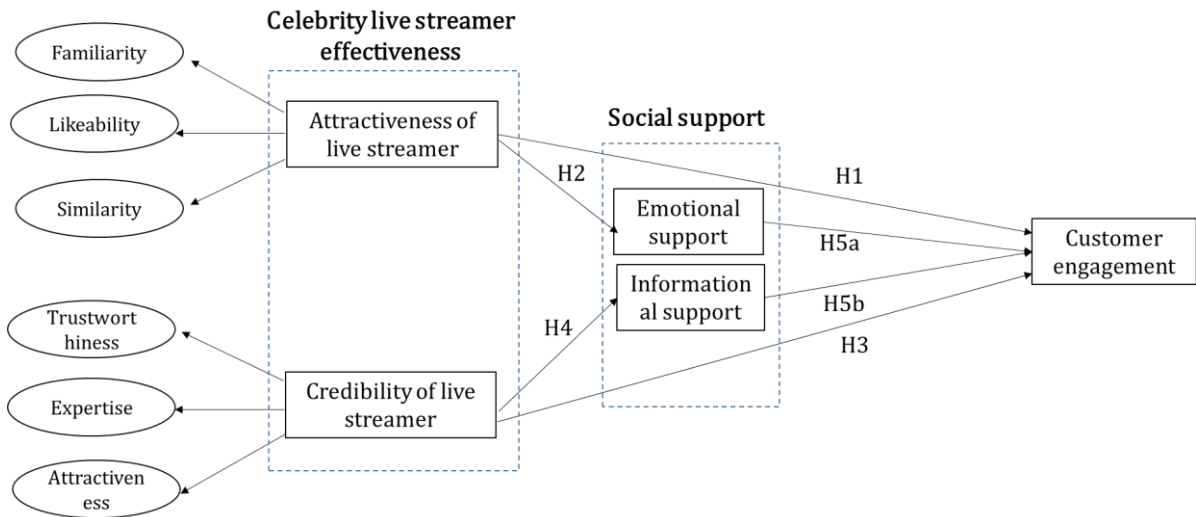


Figure 13: the research model

5. Research methodology

5.1 Research setting

To empirically test the study model and related hypotheses, I conducted an online survey of Chinese customers who had firsthand experience with Taobao Live. I chose Taobao Live due to several reasons.

First, Taobao Live, which belongs to Alibaba Group¹¹, is a leading live streaming shopping platform in China (Li et al., 2021). Along with its depth and breadth of features, it has become an essential aspect of merchants' day-to-day operations and marketing strategies. According to the Alibaba Group Announces December Quarter 2020 Report (2021), Taobao Live achieved more than 400 RMB billion in gross merchandise volume (GMV) for the fiscal year ending December 31, 2020.

Second, unlike other live streaming platforms becoming increasingly popular in China such as Tiktok, most merchants on the Taobao Live platform accept refunds by returning

¹¹ Alibaba Group is a Chinese multinational technology company specializing in e-commerce, retail, Internet, and technology. The company provides consumer-to-consumer (C2C), business-to-consumer (B2C), and business-to-business (B2B) sales.

the original items and receipt within 7 days of the purchase date. As a result, most customers decide to use the Taobao live platform if they are concerned to receive goods that differ from what they viewed previously. Besides this, if customers have problems with merchants in Taobao Live platform, they can seek assistance from Alibaba Group.

Taobao Live, differently from a traditional online ecommerce companies has adopted new strategies for customer engagement and content marketing. For instance, the Customer relationship management (CRM) tool, helps live streamers better manage their content and products, while the DAMO Academy¹²'s AI algorithms will furnishes more accurate suggestions to customers, increasing customer engagement. Therefore, Taobao Live attracts a variety of live players who want to create their own businesses by providing better service and more qualified information. During the "11.11 Global Shopping Festival" in 2020, not only top live streamers such as Li Jiaqi and Viya, but also company executives and celebrities like CEO and Founder live streams conducted individual live streaming sessions. Overall, Taobao Live platform represents a unique source of information for my research investigation in consideration also of the fact it permits to consider the different backgrounds of participants.

5.2 Measurement

In this study, I have five latent variables, namely, information support and informational support, attractiveness of live streamer, credibility of live streamer and customer engagement. Informational support and emotional support were measured with items adapted from Liang et al. (2011). Attractiveness of live streamer involves three dimensions: familiarity, likeability, and similarity of the source. Familiarity, likeability, and similarity was measured by items adapted from Theodore Byrne Peetz (2012). Credibility of live streamer was scaled by three components: expertise, trustworthiness and

12 The Alibaba DAMO Academy (Academy for Discovery, Adventure, Momentum and Outlook) Founded on October 11th, 2017 is dedicated to exploring the unknown through scientific and technological research and innovation. Website: <https://damo.alibaba.com/>

attractiveness. Expertise, trustworthiness and attractiveness was measured by items adapted from Theodore Byrne Peetz (2012). Customer engagement as measured by items adapted from Tsai and Men (2013) and Wongkitrungrueng and Assarut (2020). All measuring items were adapted from prior studies and adapted to the scenario of live streaming e-commerce. I used a seven-point Likert scale, with 1 being "strongly disagree" and 7 being "strongly agree."

5.3 Data collection

Before beginning data collection, I conducted a pilot test with my friends to ensure the validity of the survey instruments, refine the wordings, and identify areas for improvement. All of the items which I applied in this study were designed in English initially, therefore, I applied the forward-backward translation approach ¹³ to assure consistency between the Chinese and the original English version of the questionnaire.

First, I translated everything from English to Chinese by myself. Then I invited eight friends with more than two years of live streaming buying experience on the Taobao Live platform to see if the translated measurement items were easy to understand. They provided several solutions to the overlapping questions, such as the fact that the words "attractive" and "charismatic" have the same meaning in Chinese. I cut the questions that overlapped based on their suggestions. After that, I sent the modified survey to other friends to check again. I repeated this process three times until the majority of them agreed on the items. Finally, I asked three of my friends who majoring in English to compare the items in Chinese with their counterparts in English. Their evaluation feedbacks confirmed that there are no significant differences between the two versions.

¹³ The forward-backward method begins with a version of the question set in the language in which it was originally developed, English. This version is given to professional translators who translate the module into Chinese. Then, another professional translates the Chinese version back into English (back translation) and the two English versions are compared.

After these steps, the item was regarded as understandable and easy to complete, and so the survey was reputed to be ready to be issued. I used the Wenjuanwang website (<https://www.wenjuan.com>) to distribute the questionnaire, which is one of the most popular and free professional data collection websites in China. The link to the survey was shared among my friends that, in turn, forwarded it to other contacts.

To ensure the suitability of potential respondents, I included screening questions asking users if they had previously purchased products from the TAobao Live platform, so to assess the compatibility of possible responses. The questionnaire was only available to people who reported having purchased goods through Taobao Live. Following that, these customers were asked to answer questions based on their previous live streaming shopping experience. Additionally, I also included attention checks to exclude those who did not pay attention to the survey questions. In this way, if respondents had given different answers according to the questions, their questionnaire might be classified as invalid. In total, 100 valid questionnaires were received.

5.4 Sample characteristics

The demographic characteristics of the respondents are shown in Table 2: 53 percent of respondents are female, 47 percent are male; 26 percent are under the age of 25, 49 percent are between the ages of 26 and 35, and 25 percent are over the age of 35. 34 percent had a high school diploma or less, 52 percent had a bachelor's degree, and 14 percent had a master's degree. In terms of income, 74% of respondents earn less than 6500 RMB per month, 18% earn between 6501 and 9500 RMB per month, and 8% earn more than 9500 RMB per month. For employment level, 19% are students, 15% are government employees, 53% are private sector employees, 7% are self-employed, and 6% are unemployed. More than 75% of respondents have at least 1.5 years of Taobao Live usage experience, and more than 69% of respondents say they watch Taobao Live at least 4 times per month. These data points demonstrate that the majority of survey respondents have a good understanding of Taobao Live.

Table 2
Demographic statistics (N=100)

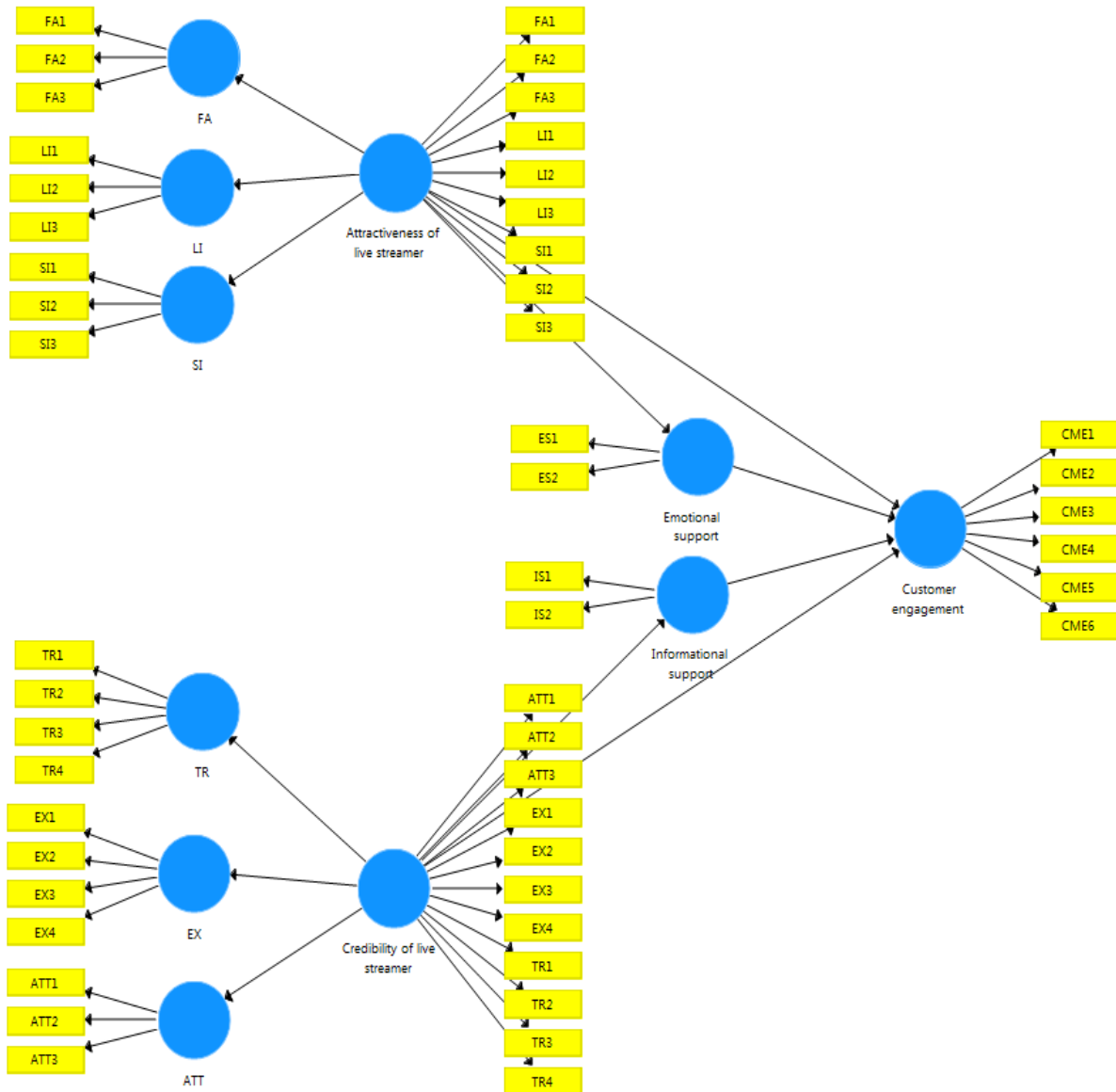
Characteristics	Frequency	Percentage
Gender		
Femal	53	53
male	47	47
Age		
≤25	26	26
26-35	49	49
≥35	25	25
Education		
≤ High school	34	34
Bachelor's degree	52	52
Master's degree	14	14
Income		
≤ 6500 yuan/ month	74	74
6501-9500 yuan/ month	18	18
≥9500 yuan/ month	8	8
Occupation		
Unemployed	6	6
Employees of company	53	53
Employees of public office	15	15
Self-employed	7	7
Student	19	19
How long have you been using Taobao Live?		
≤1 year	18	18
1.5-3 year	75	75
≥ 3 year	7	7
How frequently do you spend your time on Taobao Live platform?		
1-3 per month	23	23
4-12 per month	69	69
≥ 12 per month	8	8

6. Data analysis and results

SmartPLS Version 3.3.3 was used to run a Structural Equations Model using partial least squares– (PLS-SEM). PLS-SEM is a validated and predictive ability assessment method (Fornell and Bookstein, 1982) that has been widely used in recent research (Sun et al., 2019; Wongkitrungrueng and Assarut, 2020). Since my research model contains a second-order reflective variable, I use partial least squares (PLS) to calculate first-order variables and test second-order formative variables (Gefen et al., 2000). Additionally, in accordance with my conceptual model, I employ structural equation modeling (SEM) to analyses the mediating effects due to its advantage in testing measurement and structural models. Thus, I chose SmartPLS, which is widely used for structural equation modeling. It is capable of handling small-sample data and models with second-order reflective variables. I estimate the parameters of attractiveness of live streamer and credibility of live streamer by using a repeated indicator approach and two-stage approach in PLS. For the repeated indicator approach, attractiveness of live streamer (ATTOLS) as a higher-order latent variable is formed by familiarity, likeability, and similarity. Credibility of live streamer (CREOLS) is formed by expertise (EX), trustworthiness (TR) and attractiveness (ATT). Figure 14 shows the representation of the model adopted in the study. For the two-stage approach, I use the repeated indicator approach to obtain the latent variable scores of ATTOLS and CREOLS before then taking the scores of ATTOLS and CREOLS from the first stage as manifest variables in the presence measurement model.

A two-step data analytical procedure was employed, the measurement model was first examined to evaluate the reliability and validity of measures, and then the structural model was tested to estimate the hypotheses.

Figure 14



Source: Obtained using SmartPLS® software.

6.1 Measurement model evaluation

It is important to note that in reflective models, evaluation begins with the assessment of loading obtained by checking each indicator such as ES1 and ES2. Loadings greater than 0.70 indicate that the construct explains at least 50% of the variance in the indicator.

Table 3 shows the factor loadings, composite reliability (CR), average variance extracted (AVE) and Cronbach alpha of the nine constructs. All convergent validities (first order and second order) were acceptable, with all factor loadings greater than the 0.55 cut - off

value (Comrey and Lee, 1992). The composite reliability ranged between 0.856 and 0.956, indicating that the level of internal consistency for each construct was met. The AVEs for all constructs exceeded the minimum criterion of 0.50, ranging from 0.665 to 0.898. The Cronbach alpha ranged between 0.753 and 0.938, indicating acceptable internal consistency.

Discriminant validity was assessed by comparing the squared root of the AVEs of each construct with the correlations between the constructs. As shown in Table 4, the squared root values of the AVEs for constructs were greater than the correlations between constructs, indicating the discriminant validity between each pair of constructs. Therefore, discriminant validity was satisfied.

Table 3. Construct Reliability and Validity

Constructs	Indicators	Factor loadings	Cronbach's Alpha	Compostite reliability	Avearage vaiance extracted
First- order construct					
Emotional support	ES1	0.949	0.889	0.936	0.879
	ES2	0.948			
Informational support	IS1	0.952	0.887	0.946	0.898
	IS2	0.943			
Familiarity	FA1	0.842	0.753	0.856	0.665
	FA2	0.821			
	FA3	0.781			
Likeability	LI1	0.902	0.878	0.925	0.803
	LI2	0.918			
	LI3	0.869			
Similarity	SI1	0.803	0.811	0.888	0.727
	SI2	0.892			
	SI3	0.859			
Trustworthiness	TR1	0.902	0.93	0.950	0.826
	TR2	0.915			
	TR3	0.900			
	TR4	0.919			
Expertise	EX1	0.937	0.938	0.956	0.845
	EX2	0.914			
	EX3	0.941			
	EX4	0.882			
Attractiveness	ATT1	0.884	0.875	0.923	0.799
	ATT2	0.913			
	ATT3	0.886			
Customer engagement	CME1	0.877	0.915	0.927	0.680
	CME2	0.870			
	CME3	0.786			
	CME4	0.869			
	CME5	0.827			
	CME6	0.787			
Second-order construct					
social support	Emotional support	0.943		0.958	0.92
	Informational support	0.956			
Attractiveness of live streamer	Familiarity	0.869		0.881	0.712
	Likeability	0.852			
	Similarity	0.854			
Credibility of live streamer	Trustworthines s	0.857		0.877	0.706
	Expertise	0.908			
	Attractiveness	0.795			

Table 4 correlation of latent variables and evidence of discriminant validit

Constructs	Attractiveness of live streamer	Credibility of live streamer	Social support	Customer engagement
Attractiveness of live streamer	0.858			
Credibility of live streamer	0.689	0.855		
Social support	0.241	0.419	0.937	
Customer engagement	0.455	0.446	0.103	0.824

Notes: numbers on the diagonal(in boldface) are the suqare root of AVEs for the four construts

6.2 Structural model results

Subsequently, the path analysis, R-square, and T-value are used to analyses and explain the model verification. I bootstrap 5000 times when using SmartPLS to calculate T-values and path coefficients. I also get R-square values from SmartPLS.

Figure15 illustrates the results of the analyses on the structural model. As depicts in Figure15, the model explained 9.9%, 28.9% and 34.9% of the variances in emotional support, informational support and customer engagement respectively. I also summaries all path coefficients, related hypotheses and variance present in Table5.

The path analysis results show that attractiveness of live streamer is positively associated with customer engagement ($\beta=0.295$, $p < 0.05$) and emotional support ($\beta=0.315$, $p < 0.05$); credibility of live streamer also positively associated with customer engagement ($\beta=0.329$, $p < 0.05$) and informational support ($\beta=0.538$, $p < 0.001$).

Therefore, H1, H2, H3 and H4 were all supported. Surprisingly, informational and emotional support have opposite effects on customer engagement. Informational support has a positive effect on customer engagement, as predicted ($\beta=0.309$, $p < 0.05$). However, contrary to my prediction, the results show that emotional support has a negative interaction effect on customer engagement ($\beta=-0.394$, $p < 0.01$). Therefore, H5b was supported while H5a was not.

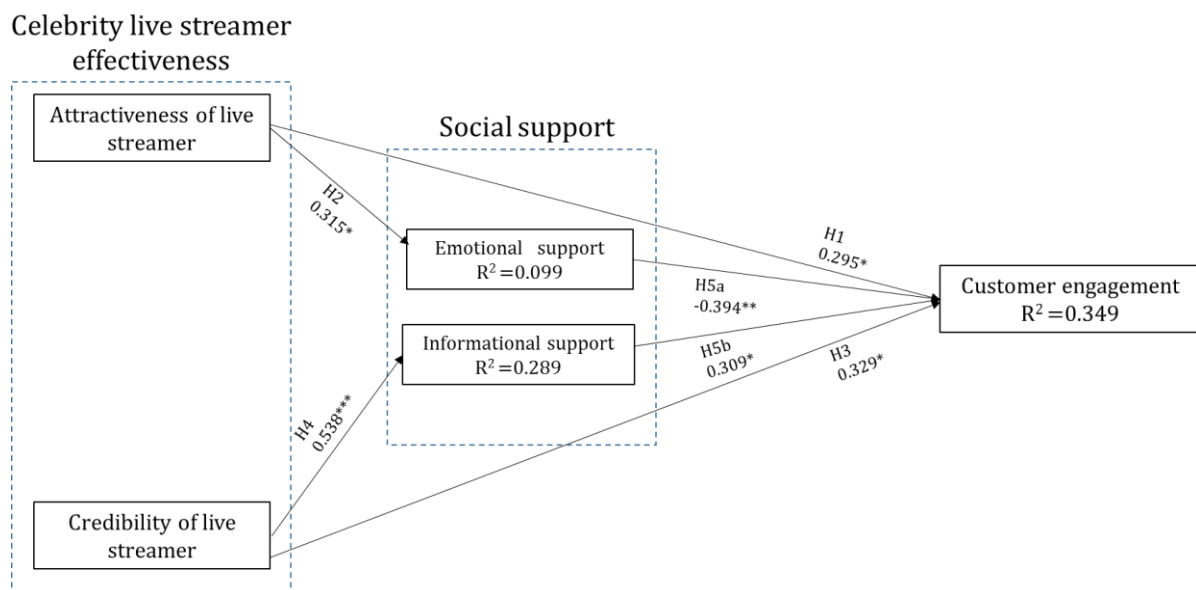


Figure 15: Graphical display of results (*p < 0.05; **P<0.01 ***p < 0.001).

Table 5: Result summary of path analysis					
Hypotheses	Coef.	R-square	T -value	P Values	Test result
Attractiveness of live streamer -> customer engagement	0.301	0.349	2.485	0.013	H1: support
Credibility of live streamer -> customer engagement	0.336		2.462	0.014	H3: support
social support -> customer engagement	-0.084		0.722	0.471	H5: not support
Attractiveness of live streamer -> social support	-0.065	0.099	0.481	0.63	H2: not support
Credibility of live streamer -> social support	0.591	0.289	5.728	0	H4: support

Notes: *p < 0.05, **P<0.01, ***p < 0.001, Attractiveness of live streamer =ATTROLS, Credibility of live streamer =CREDOLS, Emotional support= ES, Informational support=IS, Customer engagement=CE

Mediation analysis was performed to assess the mediating role of emotional support and informational support. The result (see Table 6) revealed an insignificant mediating role of emotional support ($\beta=-0.124$, $p > 0.05$). Thus, H6 was not supported. Informational support was found to be a significant mediator ($\beta=0.166$, $p < 0.05$). And it partially mediated the effect of credibility of live streamer and customer engagement. Thus, H7 was supported.

Table 6 Result of mediating effect					
	Total effect	T -value	p- value	Direct effect	p- value
ATTROLS->CE	0.171	1.284	0.199	0.295	0.017
CREDOLS->CE	0.495	3.705	0	0.329	0.014

	Indirect effect	T -value	p- value	Test result
ATTROLS -> ES ->CE	-0.124	1.855	0.064	H6: not support
CREDOLS-> IS-> CE	0.166	2.01	0.044	H7: support

Notes: *p < 0.05, **P<0.01, ***p < 0.001, Attractiveness of live streamer =ATTROLS, Credibility of live streamer =CREDOLS, Emotional support= ES, Informational support=IS, Customer engagement=CE

7. Discussion and implications

My study's main purpose has been to investigate the impact of celebrity live streamer endorser effectiveness (attractiveness of live streamer and credibility of live streamer) and social support (from emotional and informational support) on customer engagement in the live streaming e-commerce platforms.

The results show that the credibility of live streamer and attractiveness of live streamer both are positively associated with customer engagement (H1 and H3 are supported) demonstrating the importance of live streamers in this novel business model. This is consistent with a series of studies emphasizing the critical role of the live streamer (Cai et al., 2018; Hu and Chaudhry, 2020; Kang et al., 2021). In addition, the significant effect of attractiveness of live streamer shed light on Park and Lin's (2019) study, in which source attractiveness scaled solely by physical aspects failed to influence purchase intention. It also advocates that only physical attractiveness is not sufficient (McCracken, 1989). Furthermore, the results also show that the impact of live streamer credibility is greater than the impact of live streamer attractiveness. This indicates that customers are more interested in product information or product recommendations (Park and Lin, 2020) from the live streamer and peers than in instinctive requirements.

To understand better about the live streaming community, I applied emotional support and informational support to examine customer needs for the community. Interestingly, emotional support and information support both generated from the community have a completely different impact on customer engagement. The former has a negative effect (H5a is not supported), while the latter has a positive effect (H5b is supported).

The positive effect of informational support on customer engagement emphasizes the importance of providing qualified information in live streaming (Kang et al., 2021). Unlike in the offline business where customers can go to shops to talk to the sellers and touch the products, in an live streaming context all products and services are presented in a digital format. Customers may have doubts and uncertainties, so they would like to seek advice from others in the community. The online community is mainly formed by customers who have had a variety of shopping experiences and they can provide helpful advice or messages to customers from a range of opinions. The better informational support perceived, the greater motivation for the customer to participate in live streaming activities.

In contrast to my hypothesis, emotional support has a negative effect on customer engagement. According to the literature, emotional support was a significant motivator for customer engagement (Wongkitrungrueng et al., 2020; Hu and Chaudhry, 2020; Kang et al., 2021). However, when it is extended to live streaming commerce, it has a negative impact on customer engagement. This confirms that the primary goal for customers engaging in the platform is significantly different between live streaming e-commerce and s-commerce. In other words, the ultimate goal of live streaming e-commerce is shopping (Cai and Wohn, 2018), whereas s-commerce is inherently social-oriented bringing people together and allowing them to share common interests and hobbies (Shen et al., 2020).

It could be argued that emotional support from the community could distract customers' attention, resulting in annoying behavior and decreasing the motivation for the need for community. This could also be due to the fact that each live streaming activity shows different products and attracts different customers to watch, and so it is difficult for customers to meet each other again and built up a friendship. Furthermore, customers cannot return to the previous live streaming activities to review the information. Therefore for customers, their priorities are to shop rather than make friends. Hence, their intention to look for emotional support (e.g. belongings or friendship) would be undermined in this real –time situation, resulting in lower motivation for the need of the community. This finding contradicts the findings of Hu and Chaudhry (2020), who discovered that social bonds associated with service dimensions (such as friendship,

interpersonal interaction, and identification) have a positive effect on customer engagement.

In addition, the results show that the attractiveness of the live streamer and the credibility of the live streamer has a positive effect on emotional and informational support (H2 and H4 are supported), respectively. It indicates that live streamer can provide supportive behaviors and, particularly, credibility of live streamer have a great effect on informational support. Finally, the mediating test shows that informational support partially mediates the effect of credibility of live streamer on customer engagement (H7 is supported), whereas emotional support does not (H6 is not supported). It implies that source credibility and information support are so important in the context of live streaming e-commerce that they must be treated carefully in order to more convincing customer engagement.

7.1 Theoretical implications

This study contributes to the literature in two ways. First, this study primarily adopts the Source Models for celebrity endorse effectiveness (Hovland and Weiss, 1951; Hovland et al., 1953; McGuire, 1985), which is a new research perspective for live streaming e-commerce. Previous studies of live streaming e-commerce have not thoroughly studied the role of a live streamer on customer engagement behaviors, despite the fact that all the studies have indirectly pointed out the importance of live streamers in live streaming e-commerce (Wongkitrungrueng et al., 2020; Hu and Chaudhry, 2020; Kang et al., 2021; Cai et al., 2018). However, live-streaming technology allows live streamers to approach customers directly by interacting with them in real time (Kang et al., 2020), it could consider that the contributions of live streamer can directly impact customer attitudes in this era. The concept of the Source Models can help researchers indirectly involving live streamers in the research field (Theodore Byrne Peetz, 2012; Park and Lin, 2020). Therefore, I conceptualize the celebrity live streamer endorse effectiveness from two dimensions: credibility of live streamer (expertise, trustworthiness and attractiveness)

and attractiveness of live streamer (familiarity, likeability, and similarity). The results show that both have a direct positive impact on customer engagement. Therefore, there are some deficiencies in previous live streaming e-commerce research that in this study has somewhat addressed. Although some recent studies have adopted the concept of Source Models for celebrity endorse effectiveness (Park and Lin, 2020; Gao et al., 2021), this perspective has not fully adapted, they only applied two dimensions of the completed theory: trustworthiness and attractiveness. This paper fills this gap by thoroughly applying the Source Models and investigating the impact of celebrity live streamer endorse effectiveness on customer engagement. Thus, my study contributes to the extant literature on the role of live streamer in live streaming e-commerce.

Second, this study also contributes to the literature on customer behavior in live streaming e-commerce by investigating social support from emotional support and informational support. Social support has been widely studied in the social media research field (Liang et al., 2011; Chen and Shen, 2015), but this concept has not been applied in the live streaming e-commerce domain. However, the live streaming e-commerce community is an important platform not only for live streamers to promote their products and cultivate fans (Cai et al., 2018), but also for customers to seek problem solutions such as information and advice (Wongkitrungrueng et al., 2020). Therefore, it is important to understand how this dynamic community works. Although some studies have shown that the need for a live streaming e-commerce community is very lower (Cai and Wohn, 2019), which aspects of the need for the community can influence customer engagement is still unknown. The concept of social support can help researchers to consider different aspects (Liang et al., 2011). Because informational support and emotional support represent different aspects of the community (Liang et al., 2011). Informational support refers to providing messages, recommendations, advice, or knowledge that could be helpful for solving problems directly, while emotional support refers to providing messages that involve emotional concerns could be solving problems indirectly (Liang et al., 2011). One of the most interesting findings of this study is that emotional support has a negative effect on customer engagement while informational support is positive. These unexpected results indicate that customers' motivation to

engage the platform in live streaming e-commerce can be increased or decreased by the community intervention at the same time. It is inconsistent with the previous studies in the s-commerce research area where social support has a great emphasis on the community from both perspectives (Liang et al., 2011; Chen and Shen, 2015). However, unlike social commerce communities, live streaming e-commerce communities are more likely to provide messages, recommendations, and advice rather than emotional needs. Therefore, this study provides a new perspective on live streaming e-commerce community and offers a new perspective for future customer engagement research.

7.2 Managerial implications

This study also provides managerial implications to live streamers and communication managers who want to engage more viewers and achieve traffic monetizing. First, the findings confirm that the credibility of live streamer and attractiveness of live streamer can encourage customers to participate in the platform. Moreover, informational support partially mediates the effect of credibility of live streamer on customer engagement. In this regard, we can see how important information is in the context of live streaming e-commerce. Therefore, live streamers should focus on improving knowledge and skills about the products rather than talking about unrelated topics. Furthermore, in order to provide convincing messages, they should ensure that the information they are supposed to present is accurate. On the other hand, managers should carefully choose celebrity live streamers, since they have directly influence on customers' behaviors. Moreover, they also should make sure that the reputation of the live streamer they choose is matched their products. For example, a lipstick company would like to choose Li Jiaqi who is known as "King of Lipstick" to market their brands.

Second, emotional support is proven a negative effect on customer engagement in this study. This finding advice that live streamers and managers should be aware of the distinction between live streaming e-commerce and s-commerce community. The purpose of live streaming e-commerce is very straightforward and clear: shopping. Instead of

attempting to foster deep friendships within the community, live streamers should devise strategies to balance the emotional and practical needs of their customers. They can direct customers' attention to shopping while avoiding meaningless emotions that may detract from the shopping experience (Kang et al., 2021).

7.3 Limitations and future directions

Some limitations may exist in this study. First, this study investigated live streaming in e-commerce in mainland China, with all data collected from Taobao Live. The study's findings are limited to e-commerce sites. However, there are many social networking sites such as Weibo or xiaoshoushu also implemented live streaming technology to sell products. Their online communities should be different from those of traditional e-commerce platforms (Hu and Chaudhry, 2020). Future research can therefore add value by comparing customer attitudes toward the community on two different sites.

Second, although live streaming has already began several years ago in China, it was not popular in the Western world (Hu and Chaudhry, 2020). Future studies could also explore the cultural effect in live streaming e-commerce context.

Third, the negative effect of emotional support on customer engagement suggests that there must be something we do not understand. This needs further investigation, such as considering trust theory as a mediator between emotional support and customer engagement.

8. Conclusion

This study attempts to gain a better understanding of the role of live streamer and the live streaming e-commerce community on customer engagement by applying Source Models for celebrity endorse effectiveness and social support. This research conceptualized celebrity live streamer from two dimensions: attractiveness of live streamer and

credibility of live streamer. Furthermore, it applies for social support from informational and emotional aspects to explore the relationships between the live streamer and community on customer engagement in live streaming e-commerce scenarios. What emerges from this analysis is that credibility of live streamer and attractiveness of live streamer has positively significant relationships with social support and customer engagement. Unexpectedly, emotional support has a negative effect on customer engagement providing a new perspective about live stream e-commerce community. In this regard, it demonstrates that the primary goal of live streaming e-commerce appears to be completely different from s-commerce, which is primarily used for shopping rather than social interaction.

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Appendix

Construct	Question
Social support: Liang et al. (2011)	
Emotional support	ES1 When faced with difficulties, some people on Taobao Live are on my side with me.
	ES2 When faced with difficulties, some people on Taobao Live comfort and encourage me.
Informational support	IS1 On Taobao Live platform some people would offer suggestions when I need help.
	IS2 When I encounter a problem, some people on Taobao Live would give me relative information to help me overcome the problem.
Attractiveness of live streamer: Theodore Byrne Peetz (2012)	
Familiarity	FA1 When I watch live streaming in Taobao Live I recognize the live streamer

	FA2 When I watch live streaming in Taobao Live I looks like the live streamer.
	FA3 When I watch live streaming in Taobao Live I consider the live streamer to be well-known.
Likeability	LI1 When I watch live streaming in Taobao Live I enjoyed the live streamer overall personality.
	LI2 When I watch live streaming in Taobao Live I found them to be overall pleasant.
	LI3 When I watch live streaming in Taobao Live I viewed the live streamer as an overall likable person.
Similarity	SI1 When I watch live streaming in Taobao Live I viewed the live streamer as similar to me.
	SI2 When I watch live streaming in Taobao Live I felt I had a lot in common with the live streamer.
	SI3 When I watch live streaming in Taobao Live I felt like the live streamer and I shared similar viewpoints.
Credibility of live streamer :Theodore Byrne Peetz (2012)	
Trustworthiness	TR1 When I watch live streaming in Taobao Live I found the live streamer to be believable.
	TR2 When I watch live streaming in Taobao Live I felt the live streamer was trustworthy.
	TR3 When I watch live streaming in Taobao Live I believe their opinion was reliable.
	TR4 When I watch live streaming in Taobao Live I believed the live streamer was being honest.
Expertise	EX1 When I watch live streaming in Taobao Live I believed the live streamer was an expert.
	EX2 When I watch live streaming in Taobao Live I felt the live streamer was knowledgeable.

EX3 When I watch live streaming in Taobao Live I felt the live streamer was qualified.

EX4 When I watch live streaming in Taobao Live I believed they had experience with the product.

Attractiveness

ATT1 When I watch live streaming in Taobao Live I saw the live streamer as attractive.

ATT2 When I watch live streaming in Taobao Live I found the live streamer to be charismatic.

ATT3 When I watch live streaming in Taobao Live I considered the live streamer to be good looking.

Customer engagement: Tsai and Men (2013), Wongkitrungrueng and Assarut (2020)

Customer engagement

CME1 I would continue to watch Taobao Live

CEM2 I would like to choose Taobao Live platform to buy products

CEM3 I consider a live steamer that uses Taobao Live to be my first choice when buying this type of products.

CEM4 I am likely to recommend Taobao Live to my friends.

CME5 I am likely to revisit the live streamers' page to watch their new live videos in the near future.

CME6 I would interact with the live streamer and other viewers.
