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How customer engagement in the live-streaming affects purchase intention and customer acquisition, E-tailer's perspective

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ABSTRACT

In the emerging retail market, e-tailers operating in developing economies have to cope with the rapid use of the Internet, new electronic purchasing methods and online selling platforms. However, e-tailers do not understand the effect patterns in which customer engagement on purchase intention and customer acquisition. From e-tailers' perspective, this study explores how customer engagement behaviors are related to both purchase intention and customer acquisition. We obtained live streaming data in the mature e-tail live streaming market environment and found empirical evidence supporting the conceptual framework through regression model analysis. The analysis results show that the specific indicators of the customer engagement are not all positively related to customer purchase intention and customer acquisition, and it is worth noting that the influence of "like" behavior on customer acquisition is no statistical significance. This is expected to encourage e-tailers to rethink their focus on customer acquisition and sales enhancement digital strategies as they operate in emerging markets.

1. Introduction

Live streaming e-commerce has become the fastest growing new form of e-commerce in the world in the last three years. According to data from T-mall in China, within 48h of the 618 shopping festival in 2021, the live streaming e-commerce transaction volume of brand stores increased by more than 100% compared to the same period last year, and the number of live broadcast rooms of stores with a transaction of more than 10 million yuan was more than twice that of the same period last year. "Improve business efficiency through Taobao Live" has been recognized by many brands. And many international brands have used Taobao Live to reach Chinese consumers. Live streaming e-commerce has also been widely concerned with consumers in its novel form of commodity display, affordable and convenient. According to the 47th Statistical Report on Internet Development in China (CINIC, 2021), as of December 2020, the scale of online streaming users in China has reached 388 million, and 66.2% of online consumers have bought live streaming merchandise. Live streaming provides customers with added value and additional channels for customer engagement, making it a popular shopping method among consumers. Whether from the perspective of consumers or e-tailers, live streaming will become the mainstream e-commerce mode, as consumers will not change once their shopping patterns are formed.

In the recent era of Web 2.0, social commerce (s-commerce) has become a part of the retail business modes. Researchers have conducted numerous research on customer engagement in the context of s-commerce (Barger et al., 2016; Hollebeek et al., 2014; Luarn et al., 2015; Tsai and Men, 2013). Social media has emerged an important communication tool for enterprises and marketers. It is also a key driver influencing consumer attitudes and buying behaviors. For instance, e-tailers are constantly using social media to promote new merchandise and services, offer discounts, engage with consumers and solicit feedback. With the progress of 5G network technology, video has gradually become an important carrier of information expression and permeated into business operations. More and more e-tail stores are setting up live broadcast rooms. E-commerce streamers eat, play and use the goods in the live streaming, showing the value of goods to consumers vividly and interacting with customers. The interaction occurs not only between the streamer and the customer, but also among the customers. And research has shown that customers are more influential in influencing other customers' purchasing decisions. New technologies (i.e., social media, mobile apps, augmented and virtual reality) transform the interactions between the customer, the company and other stakeholders in a network of interaction in the consumer engagement (Barari et al., 2020).

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Customer engagement, refers to the level of the consumer's involvement and connection with a business's offerings or activities (Vivek et al., 2012; Wongkitrungrueng and Assarut, 2020). Customer engagement focuses on interactive consumer experiences. These interactive consumer experiences are an outcome of the emergence of a computer-mediated marketing environment due to advancement of technology and the rapid growth of the Internet (Vohra and Bhardwaj, 2019). Live streaming breaks the interactive barriers between multi-subject and is adopted to the e-tailing. The interactive properties are especially relevant for the establishment of customer engagement behaviors both before and after purchase (Verleye et al., 2014). Hu and Chaudhry (2020) also reported social bonds involving interpersonal interactions positively affect customer engagement and emphasized that customer engagement in live streaming e-commerce is critical for operators to build relationships. Then, how does customer engagement affect sales performance in live streaming e-commerce? How to generate sustainable business growth? Several studies have verified from the theoretical and empirical analysis that e-commerce benefits from the application of live streaming (Chen et al., 2018; Clement Addo et al., 2021; Zhang et al., 2019). Few researchers have conducted empirical studies on the specific operationalized of customer engagement behaviors in the interaction. And customer engagement literature has called for further research to examine the consequences of customer engagement behaviors in terms of customer behavior outcomes (e.g., purchase intention) and organization outcomes (e.g., user growth) (Li and Han, 2021). We particularly focus on this area due to the lack of research on customer engagement in the context of live streaming.

The present study aims to address the aforementioned gaps by examining how measures of customer engagement behavior are associated with purchase intention and customer acquisition in the e-tail store live streaming. Specifically, First, the customer engagement behavior indicator in the background of live streaming is determined. Second, regression analysis was conducted to examine the impact of engagement behaviors in live streaming on purchase intention and customer acquisition respectively. Furthermore, this paper investigated whether there are differences in the influence of customer engagement across different live streaming time periods. This study extends research on the e-commerce by being one of the empirical studies on live streaming shopping, and contributes to the literature in customer engagement, e-commerce selling, and customer relationship. Finally, based on the findings of this study, we put forward the strategies that e-commerce retailers should pay attention to customer engagement and specific interactive activities during live streaming.

The reminder sections of the present research are organized as follows. First, we briefly present practical and academic literature review related to customer engagement and customer engagement behaviors. Then several theories and a wide variety of relevant literature provide the theoretical background used to develop hypotheses about purchase intention and customer acquisition. Next we introduce the research methods and sample date, following the results and discussions. Finally we present the concluding section that includes theoretical contributions, managerial implications, research limitations, and future research directions.

2. Literature review

2.1. Customer engagement

Customer engagement has gained generous attention across different fields, including marketing, organizational behaviors, customer behaviors, and service management (Kumar et al., 2010; van Doorn et al., 2010; Vivek et al., 2012). van Doorn et al. (2010) defined customer engagement from the behavioral level and they believed that customer engagement goes beyond the scope of transactions and can be specifically defined as customers' behavior-driven behaviors centered on brands or companies beyond the purchase. Customer engagement is an outcome measure of the firms' activities, from this perspective, Pansari and Kumar (2017) provided a holistic definition of customer engagement as "the mechanics of a customer's value addition to the firm, either through direct and indirect contribution". Following the definition, customer engagement can be considered as a set of actions that consumers take on social media in response to brand-related content, such as reacting to content, commenting on content, sharing content with others and posting user-generated content. In recent years, S-D logic-informed customer engagement was proposed, it refers to "a customer's investment of cognitive, emotional, behavioral and social resources during, or related to, specific brand interactions" (Hollebeek et al., 2019).

The emergence of the Internet and new technologies has changed both customer and firm roles in the customer engagement process and has moved the study of engagement to the transformational level (Barari et al., 2020). It is important to conceptualize and operationalize customer engagement to align with traditional and current marketing trends. Based on the available literature and this study's objective, given the complexity of interactions in live streaming, a multidimensional view of customer engagement behaviors may best capture the dynamics of engagement behaviors in the context of live streaming. Therefore, the current study adopts a multidimensional view of customer engagement behaviors (Barger et al., 2016) to investigate the impact of customer engagement in retail live streaming activities. In this study, customer engagement behaviors are defined as ongoing, voluntary actions by online viewers that are valuable to the e-tail stores, go beyond the transaction, and stem from psychological intrinsic motivation stimulated by external factors, either emotional or cognitive (Brodie et al., 2011, 2013; van Doorn et al., 2010).

Early stage, van Doorn et al. (2010) incorporated a variety of customer behaviors that affect businesses and brands into the customer engagement behavior framework, including sales and transaction metrics, retention and cross-buying, customer recommendations, word of mouth, blogs and online postings. Many later studies have classified engagement behaviors on the basis of this research, for example, Jaakkola and Alexander (2014) described four different engagement behaviors, augmenting, co-developing, influencing, and mobilizing behaviors. Verleye et al. (2014) categorized them into cooperation, compliance, helping other customers, feedback, and positive word-of-mouth. In the context of brand-related social media content, Schivinski et al. (2016) have divided engagement into consuming content, contributing to existing content, and creating new content. From the perspective of the subject of engagement, there are two forms of customer engagement, consumer-to-consumer customer engagement and consumer-brand customer engagement (Cheung et al., 2021).

These classification views take a better insight into understanding customer engagement behaviors, although there is no universal typology of customer engagement behaviors. These engagement behaviors take place and are expressed in different ways in the live broadcast rooms, which integrate customer engagement behaviors through interactions within a service system. In related research on social media, engagement is reflected by many behaviors, such as positing likes (Tsai and Men, 2013), writing reviews (Thakur, 2018), and checking-in on a media platform (Viswanathan et al., 2017). For online platforms, click-through rate and page views are usually used to quantify customer engagement behaviors (Lehmann et al., 2012; Tsai and Men, 2013). In addition to visits, practitioners and scholars suggest using "likes" and "comments" as important indicators of customer engagement behavior in social media (Luarn et al., 2015; Wallace et al., 2014). The empirical research on customer engagement behavior in the context of live streaming e-commerce is lagging and vague. Indicators of online customer engagement behavior in the context of social media have been completely operationalized, but the generality of these indicators in the context of live streaming remains to be tested. Lin et al. (2021), in their study of emotions in live streaming, regarded the audience's rewards, likes and comments as the activities that customers engage in. Clement

Addo et al. (2021) considered customers' likes, views, chats, and time spent on the platform as customer engagement behaviors. We propose specific indicators (e.g., visits, likes and comments) for these behaviors in possible activities.

3. Theory and hypotheses development

The conceptual framework shown in Fig. 1 in this research drew upon several theories and a wide variety of relevant literature, theories including the reasoned action theory (Montano and Kasprzyk, 2015), the planned behavior theory (Madden et al., 1992), media richness theory (Goh et al., 2013; Suh, 1999), uses and gratifications theory (Katz et al., 1973; Ruggiero, 2000), and involvement theory (Zaichkowsky, 1985). Justification for adopting each theory in the context of live streaming is provided throughout the development of these hypotheses below. Customer engagement was identified as a critical factor in predicting and explaining consumer behaviour outcomes, such as purchase intention, and has been considered a successful acquisition and retention strategy for establishing and sustaining the relationship with customers (Brodie et al., 2013; Hollebeek et al., 2014, 2016; Islam et al., 2017). By utilizing the live streaming on e-commerce platforms, e-tailers provide convenience and ease of participation, which make customers engage in and enhance satisfaction, thereby motivate consumers to purchase and build relationships with the potential customers. The highly interactive and customer engagement behaviors increasingly transform e-tail store performance. In general, the store performance may be measured by increased sales. However, precise financial information on actual transactions is not readily available, it is fairly common to measure the intent to behave in a certain way as a surrogate of the actual behavior because the intent is demonstrated to be a valid predictor of actual behavior. Well-known theories such as the reasoned action theory, the technology acceptance model and the planned behavior theory use intention as a surrogate for the eventual user behavior. Therefore, we also use purchase intention as our outcome variable to see how customer engagement affect viewer intention to purchase. The concept of customer engagement has its roots in the area of relationship marketing (Ashley et al., 2011; Vivek et al., 2012). In assessing performance outcomes in marketing, customer behavior performance measures have been dominated by retention, with only recent attention focusing on acquisition (Harman and Porter, 2021; Katsikeas et al., 2016). van Doorn et al. (2010) unified the framework of customer engagement to think about the numerous customer behaviors, including word-of-mouth (WOM) activity, in Bayón (2007) empirical studies, they found that WOM referral making affects new customer acquisition. Drawing on the relevant theory and research, the conceptual framework (Fig. 1) in this study is designed to better understand how customer engagement affects the retailers concerning benefits, i.e., customer purchase intention and customer acquisition. In our attempt to identify the linking between customer engagement and purchase intention and customer acquisition, we first review the operationalization of the customer engagement constructs, followed by elaborating on these theories and relevant literature and discussing about how they help develop hypotheses.

3.1. Operationalization of customer engagement behaviors

In the context of social and online media, researchers have focused on the behavioral dimension of customer engagement (e.g., likes and comments) (Barger et al., 2016; Hollebeek et al., 2016), and further explicated the mechanism through which customer engagement influences consumer behaviors (e.g., purchase intention and eWOM) (Alhabash et al., 2015; Vivek et al., 2012). Specifically, customer engagement with social media has been measured by engagement metrics that gauge a set of behavioural responses, such as liking, viewing, sharing, and commenting (As seen in Table 1). Visits, likes and comments on the interface of the Taobao live streaming service are the manifestation of these behaviors. Specifically, visits reflect consumer awareness and attention to the e-tail store, time invested by customers, recommendations from existing customers to friends. Whilst likes reflect consumer affection and passion. Using social media has turned consumers from passive recipients of information into active producers of content (Dolan et al., 2016). Customers express themselves through comments in the live broadcast room, comments reflect sharing their knowledge and experiences in using goods and services, commenting and contributing ideas about products to brands for quality improvement or new product development, raising enquires, word-of-mouth. Accordingly, our study use engagement metrics, including the number of visits, likes and comments to operationalize and measure customer engagement in live streaming.

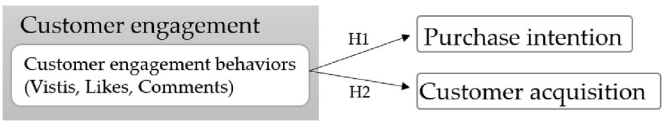

Fig. 1. Conceptual framework.

3.2. Customer engagement behaviors and purchase intention

As a highly interactive and informational communication medium, live streaming is adopted by more and more retailers to sell goods. Current literature has used media richness theory to explain how the communication media's ability to convey information richness affects purchase expenditures and outcomes (Goh et al., 2013; Suh, 1999). The media richness theory proposes that performance will be improved when information processing requirements are matched to a medium's ability to convey information richness. The notion of engaging is reflected by customer co-creative and interactive experiences (Vargo and Lusch, 2008). So we focus on the customer engagement in the context of live streaming. In the actual business situation, e-tailers gradually join the live streaming service to seize more traffic, hoping to take the lead in

Table 1
Operationalization of customer engagement behaviors in advance research.

Author	Operationalization	Research context
Kabadayi and Price (2014)	Likes, comments	Study factors affecting consumers' liking and commenting behavior on Facebook brand pages
Erkan (2015)	Likes, comments	Study the relationship between customer engagement with brands in different sectors and electronic word of mouth on Instagram.
Alhabash et al. (2015)	Likes, shares,comments	Study how the attitude/ behavioural intention relationship is mediated by intentions to like, share, and comment on persuasive social media.
Barger et al. (2016)	Likes, hearts, ratings, comments, replies,shares, retweet, reviews,posts	Review recent literature on customer engagement and propose a framework for future research.
Coelho et al. (2016)	Likes, shares	Measure the impact of the posting on important metrics in two social networks.
Lin et al. (2021)	Viewer tips, number of likes, viewers, and length of comments.	Examine the role of emotion in interactive and dynamic business settings, such as live streaming.
Annamalai et al. (2021)	Likes, comments, shares	Investigate the impact of the content type and vividness of Facebook content shared by sport clubs, on fan engagement.

attracting more customers to seize the market in the new consumption trend. Some scholars have studied the relationship between customer engagement in social media and economic performance (Algharabat and Rana, 2021; Hollebeek et al., 2014; Oliveira et al., 2016). Brodie et al. (2011) proposed that in interactive and dynamic business environments, customer engagement represents a strategic imperative for generating enhanced corporate performance, such as sales growth, a superior competitive advantage, and profitability. Customer engagement behavior has been found to be a key driver of success in online shopping environments and online brand communities. The willingness of customers to participate in the brand community can be translated into their willingness to purchase merchandise or services from the brand. In the process of interaction, customers will establish a close relationship with the brand-related community, and this relationship will promote customers to purchase merchandise or services related to the brand. In live streaming shopping, Sun et al. (2019) proposed that there is a positive relationship between customer engagement and purchase intention. In the present paper, we propose that:

H1. Customer engagement behaviors are positively associated with customer purchase intention.

The above research on customer engagement and purchase intention is conceptual in nature and has not been empirically tested. Some studies have measured and verified the relationship between customer engagement and sales performance by using specific indicators. Wongkitrungrueng et al. (2020) conducted a study on small sellers in India who adopted Facebook Live finding that are engagement outcomes closely linked to the seller's objective performance such as sales and sales leads. Engagement metrics in the forms of comments, emoticon reactions, and shares were identified. The number of comments can be accounted for by the real-time character of the interactions such as requests to take some actions, questions and answers about products and sellers, and item reservations, which are closely associated with buying behavior. There are more shares in live video than in other post types as live sellers usually ask current viewers to share their live video posts to friends in their network or Facebook group to attract more potential viewers. Emoticon reactions suggest stronger feelings and bonding between sellers and viewers. Shares reflect friends' recommendations in their research. Visits of the live streaming not only reflect friends' recommendations but also reflect the use of live streaming. According to the media richness theory and uses and gratifications theory, customers get the information they want through live streaming to make a purchase. It is plausible that pressing the like button acts as behavior that constitutes an endorsement of the message and its arguments. Intention to like the persuasive message was the strongest predictor of offline behavioral intentions (e.g., purchase intention) (Alhabash et al., 2015). Studies have focused on the behavioral dimension of customer engagement (e.g., liking and commenting) in the context of social media and online media (Barger et al., 2016; Kabadayi and Price, 2014; Tafesse, 2016), and further explicated the mechanism through which engagement influences consumer behaviors (e.g., purchase intention). In the present study with live streaming, we propose the following hypotheses:

H1a. Customer visits to a live streaming are positively associated with purchase intention.

H1b. Customer likes to a live streaming are positively associated with purchase intention.

H1c. Customer comments in a live streaming are positively associated with purchase intention.

3.3. Customer engagement behaviors and customer acquisition

Based on classical concepts of uses and gratifications theory (Katz et al., 1973; Ruggiero, 2000), customer engagement (Brodie et al., 2011; van Doorn et al., 2010), and involvement theory (Zaichkowsky, 1985). The process of customer acquisition includes three zones: gratification, participation, and customer-brand (Jahn and Kunz, 2012). The basic idea of this framework is that, if the store live streaming satisfies the particular needs of a user, this satisfaction should lead to a higher approach to the store live streaming, which should in turn lead to higher loyalty and customer follow the store, which is customer acquisition, from the e-tailer's perspective. For e-tailers, new customers mean new business growth. Customer acquisition is often mentioned in the literature as a key component of customer lifetime value (acquisition, retention, and profit margin). In this article, customer acquisition refers to the consequence of acquiring new customers or converting existing potential customers into new customers. Customer management has evolved over time passing from a transactional perspective to a relational marketing perspective, and from a relational marketing perspective to engage customers in all possible ways (Pansari and Kumar, 2017). Constructive customer engagement has been shown to increase customer acquisition (Bijmolt et al., 2010; Harmeling et al., 2017), and customer engagement has become a new indicator to evaluate customer management (Pansari and Kumar, 2017; van Doorn et al., 2010; Verhoef et al., 2010). E-tailers seek to understand how to use live streaming service to develop and maintain customer relationships. In the past, e-tailers paid a fortune to have their merchandise displayed on the first page of customers' search results, but since the adoption of live streaming services, the recommendation page of the live broadcast room has become a competitive vanity fair for e-tailers. In the live broadcast rooms, anchors use different information (such as merchandise design or price) to attract different customers and convert viewers into potential customers. In addition, some e-tailers use loyalty strategies to get existing customers to recommend new ones. Many previous studies believe that customer engagement through social media is of great help to customer acquisition (Dewnarain et al., 2021; Malthouse et al., 2013; Tanvir and Aktaruzzaman, 2021), Given that relationship quality arises from customer/brand interactions, it exists as a customer engagement consequence (Hollebeek et al., 2019). We believe that customer engagement in the context of live streaming can also attract more customers, and different engagement behaviors may have different degrees of connection with customer acquisition. On this basis, we propose the hypothesis:

H2. Customer engagement behaviors are positively associated with customer acquisition.

Engaged customers are emotionally tied to the brand/retail store and perceive interactions with the brand/retail store as rewarding and fulfilling, thus, they are more prone to developing and maintaining the relationship with the brand (Gambetti et al., 2012). Customers who engaged with a service have an emotional attitude toward that service or firm that provides it, while at the same time being more loyal than those who are not engaged (Vivek et al., 2012). Customer engagement transforms the customer relationship from a short-term, distant relationship to a long-term, intimate relationship (Sawhney et al., 2005). Viewers of live streaming expressed their positive emotions related to the brand/retail store by pressing the like button. Highly engaged customers are likely to interact with the brand, resulting in the formation of positive affective attitudes and a higher probability of repeated visits (Zhang et al., 2017). Referring friends will also be reflected in the number of visits. More interpersonal channels will have a greater positive impact on customer acquisition (Reinartz et al., 2005), and live streaming is one such channel. Viewers engage in live streaming with streamers and other viewers in the form of comments, they talk not only about goods but also about brands or stores. The number of communication contacts affects acquisition rates (Reinartz et al., 2005). Customer knowledge of a brand has a particularly strong positive relationship with all three components of customer lifetime value (customer acquisition, retention, and profit margin) (Stahl et al., 2012). Indicators reflect a wide range of customer engagement behaviors and cannot be listed in full. Based on the relationship between customer engagement and customer acquisition, we propose the following hypothesis on the

indicators, and then we will use multiple regression to verify their relationships with customer acquisition.

H2a. Visits to a live streaming are positively associated with customer acquisition.

H2b. Likes to a live streaming are positively associated with customer acquisition.

H2c. Comments in a live streaming are positively associated with customer acquisition.

4. Dataset, variables and model development

4.1. The datasets

HUITUN (https://www.huitun.com) is a professional platform for the visual analysis and monitoring of data in the field of live streaming, providing accurate, reliable and efficient live streaming data for businesses, streamers and institutions. We crawled 3849 live streamings related datasets from HUITUN paid content using Python to conduct empirical analysis. The 3,849 live streamings took place between July 15 and August 10, 2021, when there are no big shopping festivals in China (such as the 618 Shopping Festival and Double 11). During the shopping festival, e-tailers carry out various promotions and the e-commerce platforms also carry out support activities, so the results affected by more factors. We selected sample stores with live streaming srevice from the Taobao Tmall platform, which is China's largest e-commerce shopping site. Taobao, as early as 2016, started to lay out e-commerce live streaming service. Among numerous e-commerce platforms in China, Taobao takes a leading position in the scale and attention of live streaming service. We chose stores that broadcast at a fixed time every day and provide live streaming service stably, because it was more representative.

4.2. Variables

Dependent variables. It is a pity that specific sales data are not available, as e-tailers are reluctant to disclose their sales data for protection purposes. In previous studies (Cunningham et al., 2019), the number of reviews was used as the indicator for merchandise sales volume. We believe that in this way, it is difficult to distinguish whether the merchandise sales volume from live streaming or other marketing channels, and it is also difficult to trace the sales of merchandise to the specific a single live streaming. When customers buy goods on the e-commerce platform, they enter the merchandise detail page, so we use the number of times that customers enter the merchandise detail page through the merchandise order link displayed in the broadcast room to measure the purchase intention.

Stores on the Taobao platform can be followed like brand accounts on social media, after following a store, the customer may receive store new pushes about merchandise. Followers on the brand social media are considered digital social capital of the brand, and followers on brand social media contribute significantly to sales outcomes (Kim, 2020), engaged followers are more likely to have purchase intention (Rahman et al., 2018). Customers who followed the store during the live streaming may not have immediate needs, but they recognize the store/brand and may buy in the future. This type of customer is very valuable to the retailer. Therefore, we measure customer acquisition in terms of the increase in the number of people following the store during the live broadcast. Of course, we hope to obtain the accurate number of new customers to measure customer acquisition (de Vries et al., 2017; Reinartz et al., 2005), but the research on e-commerce platform retailers is limited by practical problems and can only be replaced by the increased number of people who follow the store.

Independent variables. Three dependent variables: visits, likes, and comments were chosen to operationalize customer engagement behaviors in the live streaming context. The HUITUN data platform records in detail the number of visits from the beginning to the end of each live streaming, and the number of customers' likes and the number of customers' comments, so it is not difficult to operationalize customer engagement behaviors. Different indicators reflect different psychological and behavioral activities of customers, so customer engagement was specifically quantified in our study.

Control variables. Average price, merchandise counts and duration of live streaming are also factors that may affect purchase intention and customer acquisition. Consumers rely on the price to judge the quality of goods, in terms of making purchase decision (Bergel et al., 2019; Chang and Wildt, 1994), and promotional discounts help grow a customer base by providing a low-cost environment in which consumers can learn about a product (Lewis, 2006). Although a low price strategy attract a large customer base, most of them are likely to be relatively low-value customers. The impact of price cannot be ignored so we added the price to the equation like previous research (Kaveh et al., 2020). Ko et al. (2017) found that the number of items per employee has a negative effect on the efficiency of retail stores. We think it is also necessary to take into account the number of goods appearing in the live streaming. The duration of the broadcast was also taken into account. Short hours of service are generally cost-effective for service operators, but short business hours are detrimental to consumers, who may be at a disadvantage as a result of having to move forward or delay their business transactions from their ideal time (Shy and Stenbacka, 2006). E-tail stores that provide Taobao live services for a long time may gain more customers and make more turnover. Table 2 summarizes the operationalization of the study variables.

4.3. Model specification

The following equations were proposed to test the hypothesis.

Eq. (1): purchase intention equation:

$$\mathrm{Log(PI)_i} = \beta_0 + \beta_1 \mathrm{log(VISITS)_i} + \beta_2 \mathrm{log(LIKES)_i} + \beta_3 \mathrm{log(COMMENTS)_i} + \alpha_1 \mathrm{log(AVERAGE\_PRICE)_i} + \alpha_2\ \mathrm{log(MERCHANDISE\_COUNTS)_i} + \alpha_3\ \mathrm{log\ (DURATION)i} + \mathrm{e_i}$$

Eq. (2): customer acquisition equation:

$$\mathrm{Log(CA)_i} = \delta_0 + \delta_1 \mathrm{log(VISITS)_i} + \delta_2 \mathrm{log(LIKES)_i} + \delta_3\ \mathrm{log(COMMENTS)_i} + \varphi_1 \mathrm{log(AVERAGE\_PRICE)_i} + \varphi_2\ \mathrm{log(MERCHANDISE\_COUNTS)_i} + \varphi_3\ \mathrm{log\ (DURATION)_i} + \sigma_i$$

The above log-linear formulation is used to verify the hypothesis, the log-linear formulation is consistent with the theoretical models of multistage consumer decision making process. A log transformation converts the relationship into a linear form for empirical estimation

Table 2
Operationalization of study variables.

Variables	Operationalization
Purchase intention	From the beginning to the end of a store live streaming, the number of times that customers click the order link on the live streaming interface to enter the merchandise details page.
Customer acquisition	The increase in the number of store followers from beginning to the end of a store live streaming.
Visits	The number of times the store streaming is clicked to watch on from beginning to the end of a store live streaming.
Likes	The number of that thumb is clicked in the lower right corner of the store broadcast interface from beginning to the end of a store live streaming.
Comments	The number of comments disappear on live streaming interface from beginning to the end of a store live streaming.
Average price	The average price of merchandise appeared during a store live streaming.
Merchandise counts	The number of the merchandise appeared during a store live streaming.
Duration	The duration of a store live streaming.

(Duan et al., 2008). In addition, logarithmic transformation solves the problem of variable skewness and smooths the distribution of variables in linear regression (Addo et al., 2020). The estimated coefficients in the formula reflect the elastic relationship between independent variables and dependent variables (Elberse and Eliashberg, 2003).

Eq. (1) reflects the purchase intention and Eq. (2) displays customer acquisition. Where i is the individual store live streaming. A datasets measuring variable in the equation corresponds to a store live streaming, from the beginning to the end. VISITS are the number of times visit to a store live streaming, that is, the number of times the store broadcast is clicked on to watch. LIKES are the number of times that thumb is clicked in the lower right corner of the store live streaming interface, COMMENTS are the number of viewers comments while watching the store live streaming; AVERAGE_PRICE refers to the average price of merchandise appearing during a store live streaming, MERCHANDISE_COUNTS refers to the amount of the merchandise introduced during a store live streaming, and DURATION refers to the duration of a store live streaming. β_1, β_2, β_3 is the parameter estimates what our main concern about in the purchase intention prediction equation, and δ_1, δ_2, δ_3 is the estimated coefficient of our main concern in the customer acquisition prediction equation.

5. Empirical results

By analyzing 3849 store live streaming related datasets from Taobao T-mall platform, this study examines the relationships between customer engagement and both customer purchase intention and customer acquisition. There are three independent variables responding customer engagement behaviors (i.e., visits, likes and comments), three control variables (average price, merchandise counts and duration), and two dependent variables (purchase intention and customer acquisition).

We conducted a descriptive analysis and a correlation analysis before the ordinary least squares (OLS) regression analysis. Table 3 contains some descriptive statistics about live streaming, which can provide a comprehensive understanding of the sample. This is followed by a Pearson correlation analysis to examine the correlation relationships between the variables (see Table 4). The correlation coefficients between dependent and independent variables were in general significant, which means a significant correlation was discovered between customer engagement and customers' purchase intention, but also between customer acquisition. Although the correlation coefficient between some variables is greater than 0.8, all the variable inflation factor (VIF) values are below 3.34, which indicates that there are no major multicollinearity problems (Cenfetelli and Bassellier, 2009). OLS regression was conducted to test causal relationships. The overall model is significant ($p < .000$). Regression diagnostics indicate that the estimated model is well behaved. Table 5 shows that (Table 6):

Main effects. Customer engagement behaviors in live streaming, visits positively associated with purchase intention (β=0.402, p<.01), which means that the likelihood of customers entering the merchandise detail page can be increased by the live streaming strategy. This result supports H1a; Likes are positively correlated with purchase intention (β=0.027, p<.05), thus H1b is supported. The results show that there is a positive correlation between comments and purchase intention (β=0.624, p<.01), and H1c is supported. Overall, this suggests that H1 is confirmed. When the explained variable is customer acquisition, commenting is a significant positive predictor (β=0.693, p<.01), thus supporting H2a; Visits are found positively associated with customer acquisition (β=0.328, p<.01), but likes are negatively associated with customer acquisition (β=0.102, p<.01), thus H2b is supported but H2c is rejected.

Control effects. As the result shows, the average price of merchandise in each live streaming has a positive influence on purchase intention (β=0.041, p<.01), which means that the higher the value of merchandise, customers are more willing to learn more comprehensively merchandise information through live streaming and then purchase. There is a positive relationship between the quantity of merchandise and purchase intention (β=0.282, p<.01), and the duration of live streaming is positively correlated with purchase intention (β=0.059, p<.01). There is a positive correlation between average price and customer acquisition (β=0.020, p<.05), a positive correlation between merchandise counts and customer acquisition (β=0.168, p<.01). We also note the interesting phenomenon that the relationship between the duration of live streaming and customer acquisition was not statistically significant.

In the total sample, about 90% of the datasets contain evening live streaming. It is reasonable to believe that there is a difference in the influence of engagement strategy between daytime live streaming and evening live streaming, so subsample regression analysis was conducted to verify the differences. 311 live streaming datasets only in the daytime were selected from the total sample, and to avoid the influence of sample size, 311 datasets only in the evening were randomly selected. It can be seen from the results that all indicators of engagement behavior have a significant impact on purchase intention, the results of the total sample were verified once again. According to the coefficient of subsample regression, engagement behavior indicators have a greater impact on purchase intention in evening live streaming, which may be one of the reasons why most e-tailers choose evening live streaming, we verified this phenomenon with actual data. As for the influence of engagement behaviors on customer acquisition, it can be seen from the results that the influence of likes on customer acquisition is not statistically significant only in the daytime live streaming, while the influence of visits and comments is statistically significant, and the regression coefficient is larger in the evening live streaming.

Table 3
Sample statistics.

Variables	Min	Max	Mean	SD
Purchase intention	5	187808	14019.521	19714.783
Customer acquisition	1	8571	298.765	518.492
Visits	36	1244391	65163.616	116861.821
Likes	29	6327085	57998.978	190153.639
Comments	4	51246	4574.052	5422.323
Price (RMB)	1.03	14220.97	240.973	562.547
Merchandise counts	1	350	79.913	63.891
Duration (min)	4.95	1439.90	632.960	317.948

6. Discussion

In previous studies on customer engagement in live streaming, customer engagement was studied as a one-dimensional construct (Clement Addo et al., 2021; Tafesse and Wood, 2021). In our research, the results revealed that not all customer engagement behavior indicators are positively related to customer acquisition, which means it is necessary to differentiate engagement behaviors. We found that the number of likes in the live streaming is much more than the comments, but the likes do not have a great impact on the purchase intention, and even have a negative impact on customer acquisition. The act of clicking "like" reflects certain aspects of customer engagement, but it has little impact on purchase intention and customer acquisition. So retailers are advised not to be too optimistic about the number of likes.

As shown in the results, we demonstrate that customer engagement behaviors can predict purchase intention under the content of live streaming. Visits to live streaming plays a significant role in predicting purchase intention, it has been proved by many studies that live streaming is beneficial to improve sales performance, both in the immediate and long-term sales performance (Brodie et al., 2011; Chen et al., 2018; Clement Addo et al., 2021; Zhang et al., 2019). In addition, Luo et al. (2021) reported a positive correlation between online viewers and sales, although online viewers and visits are different indicators, they all reflect the customer's time investment. The correlation between likes and purchase intention is not very strong, which indicate that interactive sessions may get viewers excited, giving a thumbs up by

Table 4
The Pearson's correlation.

	1	2	3	4	5	6	7	8
1. Purchase intention	1							
2. Customer acquisition	.859**	1						
3. Visits	.765**	.728**	1					
4. Likes	.632**	.579**	.590**	1				
5. Comments	.817**	.810**	.694**	.783**	1			
6. Price	.069**	.067**	.116**	-.032*	.040*	1		
7. Merchandise counts	.041*	.011	-.086**	-.315**	-.167**	-.160**	1	
8. Duration	.462**	.426**	.531**	.327**	.419**	.121**	-.017	1

Significance level * $p < .05$, **$p < .01$.

Table 5
Regression results.

Variables	Purchase intention	Customer acquisition
Constant	-.977(0.062) **	-1.564(0.060) **
Visits	.402(0.013) **	.328(0.013) **
Likes	.027(0.013) *	-.102(0.012) **
Comments	.629(0.016) **	.693(0.015) **
Average price	.041(0.010) **	.020(0.010) *
Merchandise counts	.282(0.013) **	.168(0.013) **
Duration	.059(0.020) **	.003(0.019)
Adj.R^2	.772	.733
Observations	3849	3849

Note: Standard errors are in parentheses. Statistical significance: *$p < .05$, **$p < .01$.

Table 6
Subsample analysis results.

Variables	Purchase intention		Customer acquisition	
	Day	Night	Day	Night
Constant	-1.234 (0.232) **	-1.437 (0.237) **	-1.606 (0.199) **	-.731 (0.242) **
Visits	.304(0.049) **	.391(0.043) **	.281(0.041) **	.341(0.044) **
Likes	.114(0.051) *	.148(0.041) **	-.042(0.044)	-.149 (0.042) **
Comments	.570(0.069) **	.708(0.053) **	.622(0.059) **	.753(0.055) **
Average price	.045(0.041)	-.031(0.027)	-.053(0.035)	.045(0.027)
Merchandise counts	.123(0.061) *	.389(0.048) **	.037(0.052)	.323(0.049) **
Duration	.381(0.073) **	-.019(0.074)	.271(0.062) **	-.471 (0.076) **
Adj.R^2	.774	.856	.765	.770
Observations	311	311	311	311

using the "like" button, but it doesn't seem to get most customers to make purchase decisions. Consistent with previous research, enjoyment is not positively related to attitude towards engaging with retail brands (Bianchi and Andrews, 2018). From a cognitive standpoint clicking on the like button is an easier behavior compared to sharing and commenting (Alhabash et al., 2015). It may not have any meaning most of the time, but may be just an act of conformity, so likes have a limited effect on purchase intention. Comments are a strong positive predictor of purchase intention. In live streaming, comments reflect most engagement behaviors such as sharing their knowledge and experiences in using goods and services, raising enquires, commenting and contributing ideas about products to brands for quality improvement or new product development, word-of-mouth. These results support previous research that flow experience (Algharabat and Rana, 2021), brand experience (Paramita et al., 2021) positively influence customer engagement.

The number of visits to live streaming is a significant positive predictor for e-tailers who want to acquit more customers, which validates Trainor et al. (2014) research findings that social media technology usage enhance customer relationship performance. However, there is a negative relationship between likes and customer acquisition. Drawing on prior research that took customer engagement as an overall construct, it was hypothesized as a positive relationship, but empirical analysis proved otherwise. Therefore, we emphasize the importance of discussing customer engagement behaviors in a disaggregated manner. Enjoyable interaction with live streaming viewers such as entertainment activities, games indeed keep customers engaged and lead to hedonic value perceived by consumers (Högberg et al., 2019), but it is not beneficial for e-tailers to acquire customers. Therefore, it is suggested that e-tailers who want to expand their market develop appropriate engagement strategies and take effective interactive activities. From another perspective, likes may come from customers' recognition of the streamer not to the brand. The comment is a vital factor in predicting customer attention to a retail store, which is consistent with Reinartz et al. (2005) research.

The results also provide novel insight into understanding the various levels of customer engagement in live streaming from time differences. This is supported by empirical evidence that customer engagement behavior is more influential at night than during the day in terms of its impact on purchase intention and customer acquisition.

7. Implications and limitations

7.1. Theoretical contributions

First, this study extends research on e-commerce by being one of the empirical studies on live streaming shopping, a facility that significantly changes the way e-tailers sell their products and enhance the online shopping experience. Existing studies mainly focus on the characteristics of live streaming and the motivations that customers watch live streaming shopping (Hu and Chaudhry, 2020; Li et al., 2021; Lu et al., 2018). There is a lack of identification with seller-centric factors that affect transactional behaviours. This paper addresses this gap in the literature by identifying the indicators of customer engagement in live streaming, and examining the influence on both purchase intention and customer acquisition.

The most noteworthy contribution of this study is the development of the measurement for customer engagement in the content of live streaming. Current research on customer engagement in live streaming measure customer engagement behaviors at the aggregate level (Clement Addo et al., 2021), or it is studied as a dependent variable (Tafesse and Wood, 2021), which is explained as a consequence. This study contributes to the current literature by measuring customer engagement on a discrete behavior level and analyzing it as an antecedent. Our findings are more generalizable relative to those measured at the aggregate level because analysis in this study reveals the relationships between each discrete behavior and purchase intention and customer acquisition, which also deepens the understanding of customer engagement consequences.

Moreover, our paper enriches the content of customer engagement, such as the scene, forms, and its potential influence. Previous studies focused mainly on firm and brand-related antecedents and outcomes of

engagement (Dessart et al., 2015; Hollebeek et al., 2014), our study takes e-tailers who adopted live streaming as the research object, expanding the application scope of customer engagement theory. Scholars have proposed different measurement methods for different social platforms. Our study enriches the form of customer engagement by measuring customer engagement with visits, likes, and comments. In addition, this study extends customer engagement research by investigating the effect of customer engagement behaviors on purchase intention and customer acquisition.

Finally, the findings provide interesting insights into consumer behavior reflecting customer engagement behavior in live streaming shopping. We adopted the indicators used in prior research for customer engagement behaviors and find they have different influences under the content of live steaming. Contry to Alhabash et al. (2015) research finding, in which like is the strongest predictor of offline behaviors, as opposed to sharing and commenting., It may give some inspiration, for example, that the generality of social media indicator is worth further discussion, or that the expression form of customer engagement may have changed and customer behavior in the context of live streaming requires new investigation.

7.2. Managerial implications

All e-tailers, especially those seeking to partner with streamers can reap the benefits from the findings.

First, empirical analysis results show that there is a significant positive relationship between customers' live streaming visits, comments and purchase intention, as well as with customer acquisition. If the exposure rate of the live streaming is increased to get more customers to watch, it will bring more purchases or attention to the store. E-tailers should pay attention to the management of customers, appropriately push the live streaming notice, and guide customers to watch. Although we didn't specifically identify negative and positive customer engagement behaviors reflected in comments, given the importance of customers' comments, the streamer is advised to make a timely response, so as to promote the purchase decision and block the impact of negative comments. E-tailers are suggested to arrange enough customer service staff to reply to the queries about merchandise, customer comments are the main clues into purchasing behavior, e-tailers should seize these precious moments to improve the efficiency of conversion from live streaming service to sales. Customers communicate with each other through the comment area of the live streaming interface. We suggest that the streamers encourage customers to share purchasing experiences by means of rewards, which will provide social support for other consumers and activate them to engage in live streaming.

Second, it is suggested that e-tailers track and manage the customers who engage in the interactions, divide them according to the degree of engagement, and develop different promotion strategies to engage customers, thereby improving the order conversion rate of the store broadcast room. Whether for new customers or existing customers, exclusive treatment helps create a favorable attitude toward the service, and these positive feelings spill over to the purchase decision-making. Furthermore, highly engaged customers can be an important source of information, so e-tailers should be good at managing and learning valuable information. During live streaming, consumers communicate with streamers to learn what they want to know. In this multi-subject space, other customers also passively obtain information, which can avoid duplicate responses from the streamers. E-tailers learn customers' focus on merchandise from customers' comments, which will be of great help to merchandise promotion and improvement in the future.

Third, the finding that the effect of customer engagement behavior is more significantly in the evening also brings us some practical implications. E-tailers with limited resources can maximize efficiency by scheduling live streaming services only in the evening. The finding also extends research on relationship marketing and selling (Arli et al., 2018; Palmatier et al., 2006) to live streaming e-commerce to explore e-tailers' strategies for establishing relationships with customers.

Finally, e-tailers are suggested to develop customer engagement strategy, according to transactional and relational selling orientation strategies across the stage of their brands/stores. Transactional selling orientation is a practice that aims at acquiring new customers and maximizing sales performance in the short term whereas relational selling orientation involves multiple interactions and value-creating transactions to maintain and strengthen the relationship with existing customers over time (Wongkitrungrueng et al., 2020). Transactional selling orientation e-tailers need to pay more attention to comments and relational selling orientation e-tailers need to pay more attention to the trend of visits.

7.3. Limitations and future research

The study has several limitations and can be addressed in future research. First, this study investigated live streaming e-commerce on the online shopping platform. However, social networking sites such as Weibo, Facebook and even Tiktok has beginning to integrate with live streaming sales of goods (Oh et al., 2017). The nature of integrated buying channels on social networks is different from the nature of live streaming in e-commerce, so consumer behavior may vary across platforms. Therefore, our research findings may not be applicable on social platforms, and customer engagement behaviors in live streaming on social platforms could be a future research direction.

Second, many e-tailers have also added the reward system into live streaming e-commerce, which can attract customers to watch live streaming for a long time and increase the possibility of purchase, this may be a moderating driver. In addition, it would also be interesting to examine whether the nature of the goods has a differential impact on consumer engagement behavior to determine optimal investment in adopting live streaming service. Due to the difficulty of obtaining data for these factors, it is not examined in this study, and future studies may examine these interesting factors.

Third, this study focused on only one online shopping platform: Taobao T-mall, which is China's largest e-commerce online shopping site. Our research may be replicated to study other shopping websites in China and even abroad. However, different findings may be found in different website characteristics and different cultural backgrounds (McNeill et al., 2014; Unnava and Aravindakshan, 2021), which will gain a broader understanding of customer engagement in the live streaming context. In addition, due to the lack of specific dates, we account for customer acquisition by the increased number of store followers. The best way to measure is of course using the number of new customers added to the customer base. However, this study has taken the first step toward a better understanding of the relationship between customer engagement and customer acquisition in the context of live streaming.

Finally, in this study, we summarized and operationalize customer engagement behaviors only through literature research, customer engagement psychology and behavior in the context of live streaming merits further empirically study such as content analysis, online survey or interview. This will certainly lead to more detailed and actionable strategic guidance for e-tailers.

8. Conclusion

At a broader level, this paper was motivated by the observation that e-tailers do not understand the effect patterns in which live streaming service on their benefit, i.e., purchase intention and customer acquisition. The notion of engaging is reflected by customer co-creative and interactive experiences (Vargo and Lusch, 2008), so we focus on the customer engagement in the context of live streaming.

Based on the prior research and data availability, we firstly determined the customer engagement behavior indicators (customer visits, likes and comments) in the context of live streaming. Then, we revealed

the relationship between these engagement behavior indicators and purchase intention and customer acquisition, respectively, through empirical analysis. Consistent with most studies, customer engagement has a positive effect on purchase intentions, but the degree of impact varies across engagement behaviors, and, for customer acquisition, some engagement behaviors even have a negative impact. Overall, the finding of this paper highlights the important point that different engagement behaviors may have different effects. The retail business may benefit more from studies segmenting these engagement behaviors. Of course, the lack of access to specific data measuring increased sales and increased customers is a major limitation of our study, and in the future, we hope to work with brands to obtain specific data to further validate the findings of this study. While the limitations of our study go beyond this, our findings provide some inspiration for future researchers in the areas of live streaming e-commerce, customer engagement, and relationship marketing.

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Declaration of competing interest

The authors declare no conflict of interest.

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