

E-service quality on live streaming platforms: swift guanxi perspective

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Abstract

Purpose – In recent years, more and more e-retailers have adopted live streaming services to attract customers. Although the extant literature has mostly examined the motivations for live streaming usage, it remains unclear how to enhance customers' purchase behaviour. Based on the social exchange theory, in the context of live streaming platforms (LSP), this study aims to investigate the impact of information quality and interaction quality on swift guanxi and customers' purchase intention.

Design/methodology/approach – This study conducted an online survey to conduct two rounds of data collection and analyses the data using SPSS and SmartPLS softwares.

Findings – The results show that information quality (believability, usefulness and vividness) and interaction quality (responsiveness, real-time interaction and empathy) are positively related to swift guanxi, which may influence customers' online purchase intention on LSP.

Originality/value – Prior service quality studies tend to focus on traditional physical stores and e-commerce websites context. This study offers the description of key dimensions of service quality on emerging LSP context. The study also confirms the importance of swift guanxi in an online marketplace.

Keywords E-commerce, Internal marketing, Customer service, Social marketing, E-commerce live streaming, Information quality, Interaction quality, Swift guanxi, Purchase intention

Paper type Research paper

1. Introduction

With the increasing popularity of information communication and network technology, e-services are playing an increasingly important role in more and more industries. Currently, COVID-19 broke out globally and has made an unprecedented impact on economic activity (Barro *et al.*, 2020). People are encouraged to keep social distance with others and work at home to mitigate the risk of infection (Jones *et al.*, 2020). How to promote e-service strategies is particularly important to achieve the goals of attracting customers, managing customer relationship and gaining online market competition (Ha *et al.*, 2014). Nowadays, online shopping has become the mainstream consumption method, but customers' growing demand for high-quality online service has not been satisfied by the traditional communication methods based on graphics and texts (Huang *et al.*, 2019). E-commerce websites and e-retailers are trying to apply new e-service marketing strategies to improve customer online purchase intention.

As a special type of video-based social media, live streaming has become a global social phenomenon in recent years

(Hu *et al.*, 2017). YouTube announced that as of June 2018, it had over 1.8 billion monthly logged-in users and more than 30 million daily active users. Currently, major e-commerce websites, such as Tmall.com and JD.com, have adopted live streaming in China. With the help of e-commerce live streaming, e-retailers can show the product details from different standpoints, try on the clothes, interact with customers in real time and demonstrate how products are produced. As live streaming has increasingly been used to promote products to potential customers, the competition among e-commerce live streaming retailers has become more intense. Therefore, the effective use of e-commerce live streaming service to enhance customer purchase intention is a vital way to gain a competitive advantage.

Prior studies have found that interpersonal relationship is essential to create an additional bond that ties the customers to the retailers and drives transaction behaviour (Netzer *et al.*, 2008; Macintosh, 2002). In the Chinese business context, a relationship is known as *guanxi* (Shi *et al.*, 2018). Owing to the collectivistic culture of China, to compensate for disadvantages

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in the institutional environment, firms rely more on *guanxi* connections (Hofstede, 1980). In the online marketplace, Ou *et al.* (2014) proposed the concept of swift *guanxi* to theoretically explain a bilateral relationship, which is vital in facilitating online transactions, as it significantly predicts customers repurchase intention (Lin *et al.*, 2018b; Shi *et al.*, 2018). As a new form of video-based social media, e-commerce live streaming facilitates the establishment and exchange of swift *guanxi* by enabling the synchronous communication and can potentially lead to the development of purchase activities (Bründl *et al.*, 2017; Ng, 2013). Therefore, swift *guanxi* is probably an important contributor to purchase behaviour on live streaming platforms (LSP).

In addition, the existing studies of live streaming found that information seeking and social interaction are two key motivations to watch, use and broadcast live streaming (Hilvert-Bruce *et al.*, 2018; Chen and Lin, 2018; Zhao *et al.*, 2018). The quality of information and interaction is the determinant of whether customers' needs can be satisfied (Juran, 1986). Moreover, interactive activities and information exchange among customers in the same live streaming room influence to a great extent their demand perception. Based on the social exchange theory (SET), positive actions can lead to a customer response and can enhance customers' commitment with the exchange relationship (Emerson, 1981). Therefore, the high quality of information and interaction may be the important antecedents of swift *guanxi* on LSP. Although Shi *et al.* (2018) identified from a quality perspective the antecedents influencing swift *guanxi* in the online marketplace, in the context of an e-commerce live streaming context, no study has considered both the antecedents and the results of swift *guanxi*.

Therefore, by examining how information quality and interaction quality drive swift *guanxi* on LSP, this study intends to explain from the customers' perspective customers' purchase intention. Specifically, we hope to address the following research issues in this study:

- RQ1. Do information quality and interaction quality help build swift *guanxi* on LSP?
- RQ2. What is the effect of swift *guanxi* on facilitating the purchase intention on LSP?
- RQ3. Does swift *guanxi* mediate the relationship among information quality, interaction quality and purchase intention on LSP?

The findings are expected to be beneficial for facilitating the interpersonal relationship and will thus promote the effectiveness of live streaming marketing.

This study provides several contributions as follows. Firstly, it helps us understand the phenomenon of e-commerce live streaming and the impact of the service quality provided by e-retailers. Prior research studies have explored different motivations for customers' engagement behaviour (Hilvert-Bruce *et al.*, 2018; Zhao *et al.*, 2018); our study extends the theoretical understanding on the antecedents of customers' purchase intention in the emerging e-commerce live streaming context. Secondly, this study complements the previous literature by extending the understanding of swift *guanxi* as a

mediator. Swift *guanxi* has been considered as the mediator of the relationship between service quality and repurchase intention (Shi *et al.*, 2018). Our study examines swift *guanxi* as the mediation mechanism among information quality, interaction quality and purchase intention. Thirdly, it integrates SET with swift *guanxi* to explain customer purchase behaviour in the emerging e-commerce live streaming context. The positive interaction and information exchange are a reciprocal process and believed to facilitate swift *guanxi*. Customers can benefit from their interaction with e-retailers and other customers.

2. Literature review

2.1 E-commerce live streaming

Live streaming is a combination of real-time video content and a text-based chat channel, which allows users to watch and broadcast video streams in real time and fosters sociability through synchronous communication via chat channels (Bründl *et al.*, 2017). With the popularity of live streaming, researchers began to examine the motivations of live streaming services (Hu *et al.*, 2017; Zhao *et al.*, 2018). In addition, the key factors driving live streaming watching and usage intention are self-identification with the broadcaster and viewing group, entertainment, social interaction and endorsement (Chen and Lin, 2018; Hu *et al.*, 2017). Moreover, social integration, affective motivations and information seeking impact the hours spent in watching, subscription behaviour and the number of streamers (Sjöblom and Hamari, 2017). In sum, information seeking and social interaction are the key motivations of live streaming viewing and broadcasting behaviour.

In practice, as a marketing strategy by e-retailers in China, live streaming has been widely adopted to show various products. E-commerce live streaming changed traditional online transactions by allowing customers to watch authentic product presentations and to interact directly with e-retailers (Hilvert-Bruce *et al.*, 2018). E-commerce live streaming not only offers a real-time watching experience for customers but also provides opportunities to communicate with e-retailers and other co-viewers (Hu *et al.*, 2017). Furthermore, e-commerce live streaming increases online traffic, helps websites accumulate customers in the short term and stimulates purchasing. Considering customers' demand for information and interaction on LSP, our study explores the impact and influence mechanisms comprising information and interaction quality.

2.2 Information quality and interaction quality on LSP

Information quality. Information quality refers to the extent to which a customer views the information provided by an e-retailer (Mun *et al.*, 2013). In the context of information systems and e-commerce, many studies have extensively examined the effectiveness of information quality dimensions (Chen and Tseng, 2011; Nelson *et al.*, 2005). Compared with general e-commerce websites, LSP are more focussed on information usefulness, believability and vividness. Firstly, information usefulness refers to customers' perception that using new information will enhance their performance (Bailey and Pearson, 1983; Cheung *et al.*, 2008). Compared with traditional e-commerce shopping, e-commerce live streaming allows a great number of customers to acquire useful

information simultaneously with less time and effort. Secondly, customers obtain majority of information by interacting with e-retailers on LSP. Information believability can be greatly ensured on LSP because customers can watch in real time an authentic product display and a sales scene. Thirdly, high vividness often implies more information cues (product image, text description, real-time video and explanations from e-retailers) and more sensory channels (sight, hearing, etc.) that can stimulate the customers' senses (Jiang and Benbasat, 2007). Thus, to measure the information quality provided by e-retailers on LSP, our study focusses on usefulness, believability and vividness.

Interaction quality. Interaction quality refers to customers' perceptions of the quality of their interaction with e-retailers during service delivery on LSP (Brady and Cronin, 2001). Based on the features of live streaming, we use real-time interaction, responsiveness and empathy to measure customers' perception of the interaction quality. Firstly, real-time interaction is the greatest difference between e-commerce live streaming and traditional e-commerce websites. In traditional e-commerce shopping, customers must use additional interactive software to contact an e-retailer. In contrast, by leaving comments through the bullet screen, customers can ask questions that e-retailers can then answer in real time on LSP (Sun et al., 2019). Secondly, responsiveness refers to the willingness of the e-commerce live streaming service provider to help customers and deliver prompt service (Leisen Pollack, 2009). Benefiting from the real-time interaction via e-commerce live streaming, customers can quickly obtain feedback to their questions from e-retailers. Thirdly, empathy refers to giving caring and individualised attention (Leisen Pollack, 2009). E-commerce live streaming allows e-retailers to solve customers' questions and provide highly personalised service. Therefore, this study uses real-time interaction, responsiveness and empathy as the dimensions of interaction quality on LSP.

2.3 Social exchange theory and swift *guanxi*

This study adopts SET to understand the concept of swift *guanxi* between customers and e-retailers on LSP. SET posits that *guanxi* comes into existence when one part does something valuable for the other part (Cropanzano and Mitchell, 2005). The tight connections among people and businesses in China are known as *guanxi* in Confucian societies. In the traditional business context, *guanxi* is defined as the relationships or social connections based on mutual interests and benefits (Lee et al., 2001). China is collectivistic to the extent that *guanxi* networks matter. In the traditional Chinese context, *guanxi* is regarded as a key determinant of business achievement. In the online marketplace, *guanxi* is often generated and exists in a short time frame, as customers do not make further contact with e-retailers after the transactions have been finished (Chong et al., 2018). Ou et al. (2014) term such *guanxi* as "swift *guanxi*", which is defined as a swiftly formed interpersonal relationship between buyers and sellers and based on reciprocal favours from both parties.

Swift *guanxi* comprises mutual understanding, reciprocal favours and relationship harmony. Mutual understanding refers to customers' and retailers' appreciation of each other's needs (Shi et al., 2018). Reciprocal favours refer to the positive benefits from customers' and e-retailers' interactions (Leung et al., 2005). Relationship harmony refers to mutual respect and conflict

avoidance (Ou et al., 2014; Shi et al., 2018). Swift *guanxi* is primarily facilitated by online service quality, interactivity and information support (Lin et al., 2018a, 2018b; Shi et al., 2018). Reciprocity and mutual attraction characteristics, such as trust and personal affection, are the basis of exchange relationships (Emerson, 1981). As a kind of online community, when customers can obtain useful information and real-time interaction from e-retailers, they may prefer to buy products or services from those e-retailers as a return for what they have received. Thus, swift *guanxi* will be built based on customer – retailer and customer–customer relationships on LSP.

3. Research model and hypotheses

3.1 Swift *guanxi* and purchase intention

Swift *guanxi* is important, as to reduce product uncertainty and trading risk, customers prefer to make transactions with e-retailers who share a personal social connection on LSP (Hou, 2007). In a social commerce context, swift *guanxi* could produce positive outcomes, such as repurchase intention (Lin et al., 2018a, 2018b). Mutual understanding is the precondition of establishing swift *guanxi* and the first step to achieving a successful transaction in the online marketplace (Luk et al., 1999). Reciprocal favours increase opportunities that drive successful transactions. Generally, e-retailers on LSP are willing to provide discount information and supply free gift activities to customers who are watching their live video. When customers develop swift *guanxi* with e-retailers on LSP, they will be encouraged to engage in positive transaction behaviours, such as buying products on the spot (Wongkitrungrueng and Assarut, 2018). Given the nature of relationship harmony, such transactions may even happen when a product is not ideal (Lin et al., 2018a). When customers achieve a mutual understanding, exchange reciprocal favours and develop relationship harmony with e-retailers on LSP, they will perform positive transaction behaviours. Accordingly, the following hypothesis is proposed.

H1. Swift *guanxi* between customers and e-retailers is positively related to purchase intention on LSP.

3.2 Information quality and swift *Guanxi*

In the online market context, consumers are more willing to conduct transactions in an efficient service system. If customers can consistently obtain assistance, such as useful information and valuable suggestions, from e-retailers on LSP, they are more likely to feel connected to e-retailers and to develop stronger trust (Cropanzano and Mitchell, 2005). According to SET, trust is important for building and maintaining relationships (Gefen and Ridings, 2002). High-quality information provided by e-retailers on LSP can lead to a mutual understanding and the fulfilment of customer needs. In turn, e-retailers can harness the e-commerce live streaming platform to attain valuable customer-proposed information, which is helpful for the improvements of products or services and the advancement of the relationship with customers (Lin et al., 2018b). We hence hypothesize the following:

H2. Information quality is positively related to swift *guanxi* between customers and e-retailers on LSP.

3.3 Interaction quality and swift guanxi

In an interpersonal service context, the interaction quality between service providers and customers is of paramount importance (Ranjan *et al.*, 2015). According to the SET, when e-retailers make efforts to show care towards their customers, customers will return good for good in proportion to what they receive; this is expected to build a stronger bilateral relationship (Wulf *et al.*, 2001). Therefore, the more the customers feel that interaction quality is being met on LSP, the more favourably the customers should perceive the online *guanxi* with e-retailers. According to Ou *et al.* (2014), in the online marketplace, swift *guanxi* between customers and e-retailers is facilitated by interactivity. Through real-time interaction on LSP, customers and e-retailers can listen to each other and negotiate purchase details. This interactive process helps to develop a mutual understanding between customers and e-retailers and facilitates the achieving of an outcome that is ultimately satisfactory to both parties. Thus, high-quality interaction is critical to establishing relationships. Accordingly, we postulate the following:

H3. Interaction quality is positively related to swift *guanxi* between customers and e-retailers on LSP.

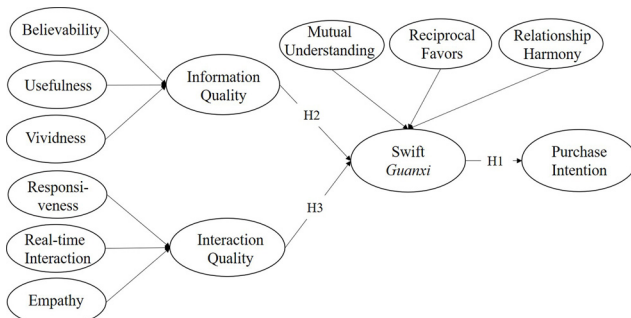
In sum, Figure 1 illustrates our research framework.

4. Research methodology and data analysis

4.1 Measurement items development

Most of the scale items were selected from the existing literature, and the wording was modified to fit the features of e-commerce live streaming. Appendix lists the detailed measurement items and sources. Because the survey was translated into Chinese, we followed the forward-backward translation method to ensure the translation validity. Firstly, a researcher translated the original items into Chinese. Secondly, another researcher back-translated the Chinese version items into English. Thirdly, we compared the two English versions and made modifications to ensure that the Chinese scales accurately convey the intended meaning. Finally, to assess a pilot test in terms of logical consistency, ease of understanding, question sequence and context suitability, 16 panellists (including marketing managers, undergraduate students who frequently shop via live streaming and PhD students from business school) were interviewed. Based on their feedbacks, we refined and finalised the scales for all variables. All items were evaluated by using a seven-point Likert scale, on which the responses ranged from 1 (strongly disagree) to 7 (strongly agree).

Figure 1 Research framework



4.2 Sample and data collection

This study used an online survey to conduct two rounds of data collection from college students. To identify and test the underlying structure of the scale and the dimensions of the constructs, exploratory factor analysis (EFA) was conducted on the first round data set. Confirmatory factor analysis (CFA) was conducted on the second round data set to further examine the measurement model and test the research hypotheses. To ensure data quality, an attention check question (e.g. did you watch/purchase on LSP) was included in the survey questionnaire. In the first round of data collection, we approached a total of 368 respondents, of which 232 (63.0%) respondents ultimately completed the questionnaires. We examined all the answers and eliminated respondents who spent less than 5 min on the questionnaire. Moreover, we removed respondents whose answer deviates exceptionally from the cell mean, with 2.5 standard deviations being the threshold (Meyvis and van Osselaer, 2017). Finally, 207 valid questionnaires were analysed. In the second round of data collection, we approached a total of 375 respondents, of which 241 (64.3%) respondents completed the questionnaires. We removed the repeated respondents by checking the payment accounts to ensure that there was no overlap between the first and second rounds. A total of 210 valid questionnaires were finally analysed. The demographic information of the samples is shown in Table 1.

4.3 Data analysis and results

Scale assessment. To identify the underlying structure of the scale and the dimensions of constructs, we used SPSS 22.0 software to conduct the EFA with principal component extraction and varimax rotation. Of the factors, ten factors with eigenvalues greater than one were extracted, and these altogether explained 73.3% of the variance. Consistent with Choudhury and Karahanna's study (2008), items should be dropped if they load properly on each factor less than 0.5 or

Table 1 Demographic information of 1st and 2nd round participants

Characteristic	Item	Frequency (%)	
		1st round	2nd round
Gender	Male	95 (45.9%)	97 (46.2%)
	Female	112 (54.1%)	113 (53.8%)
Age	Less than 20	32 (15.5%)	25 (11.9%)
	21–25	152 (73.4%)	161 (76.7%)
	26–30	22 (10.6%)	24 (11.4%)
	Above 30	1 (0.5%)	0 (0%)
Level of education	High school or below	0 (0%)	1 (0.5%)
	Junior college	23 (11.1%)	13 (6.2%)
	Bachelor's degree	159 (76.8%)	168 (80.0%)
	Master degree and above	25 (12.1%)	28 (13.3%)
Frequency of watching live streaming	Several times a day	62 (30.0%)	60 (28.6%)
	Once a day	15 (7.2%)	22 (10.5%)
	Several times a week	64 (30.9%)	63 (30.0%)
	Once a week	12 (5.8%)	18 (8.6%)
	Several times a month	28 (13.5%)	27 (12.8%)
	Once a month	26 (12.6%)	20 (9.5%)

Notes: 1st round: *N* = 207; 2nd round: *N* = 210

exhibit a cross loading over 0.5. Item 5, regarding mutual understanding (MU5), was excluded from further analysis because of its low factor loading. Table 2 shows the refined 10-dimension scale and the 40 items used for further testing.

Measurement model analysis. We evaluated the measurements and structural model by using partial least squares (PLS). PLS can ensure more theoretical parsimony and less model complexity (Wetzels *et al.*, 2009). Moreover, PLS is flexible in handling both reflective and formative constructs (Zheng *et al.*, 2013). PLS requires the smallest sample size to be at least 10 times the number of items present in the largest construct (Chin *et al.*, 2003). Our sample size of 210 was sufficient for the use of the PLS technique. Initially, to further test the factor structure of the

scale, we used the second round data set to conduct a CFA. This includes the assessment of convergent and discriminant validity. Convergent validity can be evaluated with the item factor loading, the average variance extracted (AVE), the composite reliability (CR) and the Cronbach's alpha. The general acceptable cut-off values are 0.50 for the AVE and 0.70 for the factor loading of CR and the Cronbach's alpha. As shown in Table 3, representing that convergent validity is acceptable for all constructs in this study, both the CR values and Cronbach's alphas of all constructs are above 0.7; the factor loadings of all items are above 0.7; and the AVE for each construct surpasses 0.5.

Discriminant validity reflects the extent to which the constructs are significantly different from each other. To test

Table 2 Factor loadings and cross factor loadings of measures

Indicator	BEL	USE	VIV	RES	RTI	EMP	MU	RF	RH	PI
BEL1	0.616	–	–	–	–	–	–	–	–	–
BEL2	0.601	–	–	–	–	–	–	–	–	–
BEL3	0.752	–	–	–	–	–	–	–	–	–
BEL4	0.553	–	–	–	–	–	–	–	–	–
VIV1	–	0.538	–	–	–	–	–	–	–	–
VIV2	–	0.684	–	–	–	–	–	–	–	–
VIV3	–	0.788	–	–	–	–	–	–	–	–
VIV4	–	0.805	–	–	–	–	–	–	–	–
VIV5	–	0.736	–	–	–	–	–	–	–	–
USE1	–	–	0.669	–	–	–	–	–	–	–
USE2	–	–	0.787	–	–	–	–	–	–	–
USE3	–	–	0.595	–	–	–	–	–	–	–
USE4	–	–	0.726	–	–	–	–	–	–	–
RES1	–	–	–	0.737	–	–	–	–	–	–
RES2	–	–	–	0.730	–	–	–	–	–	–
RES3	–	–	–	0.709	–	–	–	–	–	–
RES4	–	–	–	0.655	–	–	–	–	–	–
RTI1	–	–	–	–	0.630	–	–	–	–	–
RTI2	–	–	–	–	0.686	–	–	–	–	–
RTI3	–	–	–	–	0.632	–	–	–	–	–
RTI4	–	–	–	–	0.637	–	–	–	–	–
RTI5	–	–	–	–	0.604	–	–	–	–	–
EMP1	–	–	–	–	–	0.717	–	–	–	–
EMP2	–	–	–	–	–	0.757	–	–	–	–
EMP3	–	–	–	–	–	0.521	–	–	–	–
EMP4	–	–	–	–	–	0.703	–	–	–	–
MU1	–	–	–	–	–	–	0.627	–	–	–
MU2	–	–	–	–	–	–	0.629	–	–	–
MU3	–	–	–	–	–	–	0.785	–	–	–
MU4	–	–	–	–	–	–	0.770	–	–	–
RF1	–	–	–	–	–	–	–	0.772	–	–
RF2	–	–	–	–	–	–	–	0.797	–	–
RF3	–	–	–	–	–	–	–	0.831	–	–
RF4	–	–	–	–	–	–	–	0.799	–	–
RH1	–	–	–	–	–	–	–	–	0.847	–
RH2	–	–	–	–	–	–	–	–	0.862	–
RH3	–	–	–	–	–	–	–	–	0.898	–
PI1	–	–	–	–	–	–	–	–	–	0.716
PI2	–	–	–	–	–	–	–	–	–	0.719
PI3	–	–	–	–	–	–	–	–	–	0.771

Table 3 Reliability and convergent validity results

Constructs	Factor loading	Average variance extracted (AVE)	Composite reliability (CR)	Cronbach's alpha
Believability (BEL)	–	0.677	0.894	0.841
BEL1	0.816	–	–	–
BEL2	0.861	–	–	–
BEL3	0.799	–	–	–
BEL4	0.815	–	–	–
Usefulness (USE)	–	0.748	0.922	0.888
USE1	0.881	–	–	–
USE2	0.842	–	–	–
USE3	0.863	–	–	–
USE4	0.873	–	–	–
Vividness (VIV)	–	0.706	0.923	0.896
VIV1	0.804	–	–	–
VIV2	0.831	–	–	–
VIV3	0.845	–	–	–
VIV4	0.842	–	–	–
VIV5	0.877	–	–	–
Responsiveness (RES)	–	0.738	0.918	0.882
RES1	0.881	–	–	–
RES2	0.843	–	–	–
RES3	0.874	–	–	–
RES4	0.839	–	–	–
Real-time interaction (RTI)	–	0.678	0.913	0.881
RTI1	0.851	–	–	–
RTI2	0.832	–	–	–
RTI3	0.777	–	–	–
RTI4	0.826	–	–	–
RTI5	0.829	–	–	–
Empathy (EMP)	–	0.763	0.928	0.896
EMP1	0.873	–	–	–
EMP2	0.914	–	–	–
EMP3	0.861	–	–	–
EMP4	0.845	–	–	–
Mutual understanding (MU)	–	0.759	0.927	0.895
MU1	0.882	–	–	–
MU2	0.885	–	–	–
MU3	0.851	–	–	–
MU4	0.867	–	–	–
Reciprocal favours (RF)	–	0.721	0.912	0.871
RF1	0.831	–	–	–
RF2	0.863	–	–	–
RF3	0.847	–	–	–
RF4	0.856	–	–	–
Relationship harmony (RH)	–	0.818	0.931	0.889
RH1	0.898	–	–	–
RH2	0.901	–	–	–
RH3	0.915	–	–	–
Purchase intention (PI)	–	0.837	0.939	0.903
PI1	0.922	–	–	–
PI2	0.886	–	–	–
PI3	0.936	–	–	–

the discriminant validity, we examined factor correlations and assessed whether the correlation between a pair of constructs was less than the square root of the AVE of each construct (Chin *et al.*, 2003). As shown in Table 4, all the square roots of the AVEs for constructs are greater than its correlations with other constructs, confirming the discriminant validity of the scale. To further test discriminant validity, we also conducted the heterotrait–monotrait ratio of correlations of constructs. The results show that all the constructs' values pass the threshold values of 0.85 (Kline, 2010) or 0.95 (Gold and Malhotra, 2001).

This study also examined multicollinearity in the formative constructs of information quality, interaction quality and swift *guanxi*. Table 5 presents the variance inflation factors (VIFs). All the VIFs are less than the threshold of 10 (Petter *et al.*, 2007), suggesting that multicollinearity is not a problem in our study. Therefore, we confirm that information quality, interaction quality and swift *guanxi* can be conceptualised as formative constructs.

Owing to the single survey method used to collect responses, common method bias (CMB) may exist (Zheng *et al.*, 2013). We first used Harman's post hoc one-factor test to examine CMB (Podsakoff and Organ, 1986). All the construct's items were cast into principal components factor analysis. The result yielded seven factors with eigenvalues greater than 1.0; these factors accounted for 71.7% of the total variance. The first factor explains 35.4%, which is less than 40% of the total variance. To further assess CMB, we loaded all items on only a single first-order factor and examined factor loading scores and model-fit indexes (Podsakoff *et al.*, 2003). As shown in Table 6, most factor loading scores are reduced and some scores are even lower than the threshold. Moreover, model fit indices of normed fit index (NFI) = 0.712 is unacceptable and root mean square residual (RMR) = 0.067 is significantly worse than previous measurement model. Second, following Podsakoff and Organ (1986) and Liang *et al.* (2007), we used the common method factor to further examine the CMB. We calculated each item's variance as substantively explained by the principal construct and by the common method factor. As shown in Table 7, the average variance of the items ($R1^2$) is 0.498 and the average method factor ($R2^2$) is 0.086. Moreover, all items had significant substantive loadings ($R1$) on the principal constructs, whereas most of their method factor

loadings ($R2$) were not statistically significant. This suggests that CMB is not a large concern in this study.

Structural model analysis. A bootstrapping procedure with 5,000 iterations was performed to examine the statistical significance of the weights of the first-order constructs and the path coefficients (Chin *et al.*, 2003). As shown in Figure 2, with all the paths significant at the 1% level, the hypothesized relationships are supported. Information quality and interaction quality jointly explain 64.4% of the variance in swift *guanxi* ($R^2 = 0.644$), whereas information quality, interaction quality and swift *guanxi* jointly explain 46% of the variance in purchase intention ($R^2 = 0.460$). Moreover, the value of RMR in this study is 0.056, which appears to be adequate for PLS path models (Hu and Bentler, 1999). The NFI value of 0.856 also is acceptable (Sargeant *et al.*, 2006). Moreover, we test an alternative model that removes swift *guanxi* and proposes that information quality and interaction quality directly affect purchase intention. The result shows that the alternative model explains less of the variance in purchase intention (i.e. $R^2 = 0.415$). Thus, we prefer our proposed model over the alternative model. In addition, as a control variable, gender has a significant impact on purchase intention.

Testing of the mediating effect. We followed Baron and Kenny's (1986) procedures to test the mediating role of swift *guanxi*. Firstly, we tested the direct impacts of information quality and interaction quality on purchase intention. Secondly, considering swift *guanxi* as the mediator, we tested the indirect impact of information quality and interaction quality on purchase intention. As shown in Table 8, indicating that swift *guanxi* mediates the relationships among information quality,

Table 5 Formative indicator VIFs

Construct	Indicator	VIFs
Information quality	BEL	2.460
	USE	2.726
	VIV	2.575
Interaction quality	RES	2.291
	RTI	2.934
	EMP	2.379
Swift <i>guanxi</i>	MU	2.522
	RF	3.098
	RH	1.906

Table 4 Discriminant validity of the constructs

Construct	BEL	USE	VIV	RES	RTI	EMP	MU	RF	RH	PI
BEL	<i>0.823</i>	–	–	–	–	–	–	–	–	–
USE	0.745	<i>0.865</i>	–	–	–	–	–	–	–	–
VIV	0.728	0.709	<i>0.840</i>	–	–	–	–	–	–	–
RES	0.650	0.619	0.581	<i>0.859</i>	–	–	–	–	–	–
RTI	0.653	0.708	0.628	0.733	<i>0.823</i>	–	–	–	–	–
EMP	0.523	0.589	0.512	0.659	0.747	<i>0.874</i>	–	–	–	–
MU	0.597	0.619	0.508	0.678	0.725	0.775	<i>0.871</i>	–	–	–
RF	0.595	0.658	0.594	0.680	0.697	0.687	0.764	<i>0.849</i>	–	–
RH	0.515	0.669	0.521	0.503	0.611	0.503	0.596	0.690	<i>0.905</i>	–
PI	0.614	0.674	0.57	0.609	0.701	0.625	0.609	0.626	0.591	<i>0.915</i>

Note: The italic diagonal values are the square root of AVEs

Table 6 Factor loading of first-order factor

Constructs	Factor loading	Constructs	Factor loading
Believability (BEL)		RTI4	0.763
BEL1	0.692	RTI5	0.806
BEL2	0.771	<i>Empathy (EMP)</i>	
BEL3	0.736	EMP1	0.788
BEL4	0.715	EMP2	0.807
Usefulness (USE)		EMP3	0.738
USE1	0.772	EMP4	0.779
USE2	0.768	<i>Mutual understanding (MU)</i>	
USE3	0.803	MU1	0.820
USE4	0.806	MU2	0.800
Vividness (VIV)		MU3	0.779
VIV1	0.708	MU4	0.797
VIV2	0.758	<i>Reciprocal favours (RF)</i>	
VIV3	0.800	RF1	0.742
VIV4	0.809	RF2	0.816
VIV5	0.769	RF3	0.790
Responsiveness (RES)		RF4	0.789
RES1	0.777	<i>Relationship harmony (RH)</i>	
RES2	0.693	RH1	0.822
RES3	0.770	RH2	0.682
RES4	0.762	RH3	0.674
Real-time interaction (RTI)		<i>Purchase intention (PI)</i>	
RTI1	0.817	PI1	0.922
RTI2	0.738	PI2	0.886
RTI3	0.695	PI3	0.936

interaction quality and purchase intention, there are significant direct and indirect impacts of information quality and interaction quality on purchase intention.

5. Discussion and implications

5.1 Discussion of findings

Firstly, this study extends the *guanxi* literature to the e-commerce live streaming context by examining the impact of swift *guanxi* on customers' purchase intention. Computer-mediated communication technology provides a quick way to build a relationship between customers and e-retailers. Our empirical results suggest that swift *guanxi* is a significant factor in customers' purchase intention on LSP. Our findings are congruent with prior findings, which imply that the higher customers perceive the level of mutual understanding, reciprocal favours and harmony relationship to be, the stronger their intention to make a positive decision in the online marketplace (Lin et al., 2018b; Ou et al., 2014; Shi et al., 2018).

Secondly, this study explores how e-retailers can enhance their information quality to build swift *guanxi* with customers on LSP. The customers' perception of information believability, usefulness and vividness is positively related to swift *guanxi*. Moreover, the e-commerce live streaming platform helps e-retailers to better understand customer expectations for online products. If e-retailers provide customers with useful information, customers will find what they exactly need in a short time frame. Thus, useful information helps build swift *guanxi* on LSP. Consistent with the SET, in an online marketplace, information believability increases customers' perception of trust, which was found to

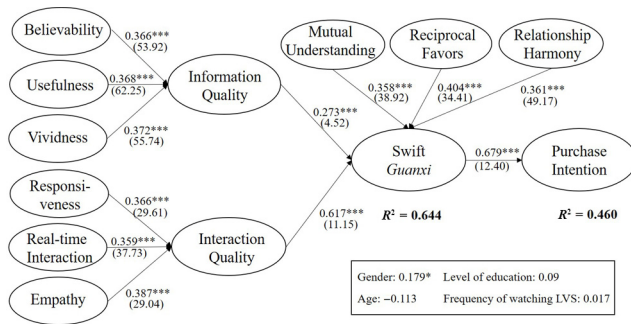
Table 7 Common method bias analysis

Construct	Indicator	Substantive loading (R_1)	R_1^2	Method factor loading (R_2)	R_2^2
Information quality	BEL1	0.595***	0.354	0.298	0.089
	BEL2	0.732***	0.536	0.304	0.092
	BEL3	0.696***	0.484	0.319	0.102
	BEL4	0.738***	0.545	0.293	0.086
	USE1	0.731***	0.534	0.294	0.086
Interaction quality	USE2	0.666***	0.444	0.290	0.084
	USE3	0.747***	0.558	0.279	0.078
	USE4	0.715***	0.511	0.292	0.085
	VIV1	0.715***	0.511	0.241	0.058
	VIV2	0.746***	0.557	0.242	0.059
	VIV3	0.771***	0.594	0.243	0.059
	VIV4	0.722***	0.521	0.237	0.056
	VIV5	0.710***	0.504	0.225	0.051
	RES1	0.727***	0.529	0.279	0.078
	RES2	0.710***	0.504	0.298	0.089
	RES3	0.704***	0.496	0.298	0.089
	RES4	0.749***	0.561	0.289	0.084
	RTI1	0.731***	0.534	0.251	0.063
	RTI2	0.695***	0.483	0.256	0.066
	RTI3	0.760***	0.578	0.225	0.051
Swift <i>guanxi</i>	RTI4	0.719***	0.517	0.243	0.059
	RTI5	0.726***	0.527	0.239	0.057
	EMP1	0.619***	0.383	0.287	0.082
	EMP2	0.763***	0.582	0.298	0.089
	EMP3	0.704***	0.496	0.280	0.078
	EMP4	0.784***	0.615	0.278	0.077
	MU1	0.709***	0.503	0.277	0.077
	MU2	0.733***	0.537	0.288	0.083
	MU3	0.763***	0.582	0.289	0.084
	MU4	0.632***	0.399	0.293	0.086
	RF1	0.616***	0.379	0.283	0.080
	RF2	0.734***	0.539	0.302	0.091
	RF3	0.683***	0.466	0.296	0.088
	RF4	0.652***	0.425	0.296	0.088
	RH1	0.744***	0.554	0.381	0.145
Purchase intention	RH2	0.660***	0.436	0.361	0.130
	RH3	0.701***	0.491	0.364	0.132
	PI1	0.622***	0.387	0.366	0.134
Average	PI2	0.628***	0.394	0.355	0.126
	PI3	0.597***	0.356	0.372	0.138
Average		0.704	0.498	0.290	0.086

Note: ***Denotes significance level of 0.1%

positively influence the establishment of swift *guanxi* between customers and e-retailers.

Thirdly, this study also confirms the important role of interaction quality in affecting the creation of swift *guanxi* between customers and e-retailers on LSP. Moreover, the impact of interaction quality on swift *guanxi* (0.617) is much greater than that of information quality (0.273). The result is consistent with a prior finding that in communication in online communities. Our study results support prior findings that online real-time interaction significantly increases patronage intention (Etemad-Sajadi, 2016). In addition, we further

Figure 2 Result of structural model analysis

Notes: ***, ** and * denote significance levels of 0.1%, 1% and 5%, respectively

Table 8 Path coefficients of mediating effects

	Non-mediated model Purchase intention	Mediated model (swift <i>guanxi</i> as the mediator) Purchase intention
Information quality	0.33***	0.19***
Interaction quality	0.47***	0.42***

Note: ***Denotes significance level of 0.1%

investigated the internal influence mechanism of swift *guanxi*. E-retailers also can provide customers with in-time feedback (responsiveness) and personal service (empathy), which can enhance the customers' perceptions of interaction quality. According to SET, the cooperative intention of e-retailers will promote reciprocal favours between customers and e-retailers. The high interaction quality will satisfy customers in information seeking and the e-retailers' need for products/service selling.

5.2 Theoretical implication

Firstly, by using SET as a theoretical ground to explain customers' purchase behaviour, this study extends the application of SET from customer relationship management to the emerging e-commerce live streaming context (Gefen and Ridings, 2002; Sierra and McQuitty, 2005). According to SET, online transactions have a strong social orientation and rely heavily on the interpersonal exchange of favours. Our study suggests that on LSP, the high quality of information and interactions contributes to the online relationship between e-retailers and customers and thereby helps to improve the customers' purchase intention. The findings are consistent with the SET premise that high-quality information and interaction can enhance cooperation intention and then increase commitment through a bilateral relationship (Sierra and McQuitty, 2005).

Secondly, this study offers a novel insight for exploring the impact of information quality and interaction quality on customers' purchase intention on LSP. Although extensive studies have focused on users' motivations of live streaming engagement (Hu et al., 2017; Zhao et al., 2018), the

determinants of enhanced customer purchase intention on LSP are unknown. Our study compensates existing research results by providing direct empirical support and validating that information quality and interaction quality are two critical factors that facilitate customers' purchase intention on LSP. Furthermore, our empirical study confirms that customers' perceived service quality could be classified into information quality and interaction quality (Gorla et al., 2010; Ranjan et al., 2015), enriching literature on measurement and impact of e-service in the emerging context of e-commerce live streaming.

Thirdly, this study extends the online relationship marketing literature by investigating the building of swift *guanxi* on LSP. Previous literature has recognised information seeking and social interaction as important motivations for customer behaviour but has not theoretically developed the mechanism (Hilvert-Bruce et al., 2018; Hu et al., 2017; Zhao et al., 2018). By introducing the concept of swift *guanxi*, our results indicate that information quality and interaction quality contribute to building swift *guanxi* between e-retailers and customers on LSP. The results expand the results of Shi et al. (2018) who found that the perceived online service quality factors (i.e. perceived control, convenience and customer service) have a positive effect on swift *guanxi*. The results of our study add to the understanding of how in the emerging e-commerce live streaming context, different types of perceived quality dimensions facilitate customers' purchase intention.

5.3 Practical implications

Firstly, our study can help e-retailers on LSP to develop a strategic plan to build swift *guanxi* between customers and themselves and ultimately, to improve their customers' purchase intention. The e-retailers should promote via e-commerce live streaming each aspect of information quality and interaction quality. With respect to improving customers' perceptions of information quality, e-retailers should distinguish the importance of information and convey the core information to customers. As rich and diverse information will increase the vividness of information, e-retailers should pay more attention to the ways of information presentation. In addition, to make it easier for customers to generate a sense of believability, the e-retailers should clearly present the information to customers. Meanwhile, to improve customer perceptions of interaction quality, in e-commerce live streaming, e-retailers should maximise the advantage of real-time interaction by offering marketing services. E-retailers should also try to express their concern for customers and show their interest in meeting the specific requirements of customers.

Secondly, according to SET, e-retailers and customers engage in information and social exchange on LSP in the hope of obtaining some rewards in return. E-retailers should be aware that swift *guanxi* is built over time in the social exchange process where the context of previous exchanges experience cannot be ignored. Mutual understanding, reciprocal favours and relationship harmony comprise the premise of online purchase decision-making (Lin et al., 2018b; Ou et al., 2014; Shi et al., 2018). If e-retailers expect to receive a successful transaction from customers as a reward, they should provide customers favours and attractions, such as promotion information, coupon and small gifts, to build swift *guanxi* and

to increase the cooperative intention of customers. During the transaction process, e-retailers can also care for customers through providing communication, including understanding the customers' point of view and following the flow of conversation. From the utilitarian and sociological perspective, a successful e-retailer on LSP should provide not only high-quality information and service interactions but also the functionality that enables the exchange of reciprocal favours with customers.

6. Conclusions and future research

To conclude, this study identifies the dimensions of service quality on LSP. The key dimensions of interaction quality are real-time interaction, responsiveness and empathy, whereas the dimensions of information quality are usefulness, believability and vividness. The study also empirically validates the effects of information quality and interaction quality on customer purchase intention and confirms the critical role of swift *guanxi* for understanding the relationship. These findings offer important empirical evidence and provide conceptual clarity to the service quality dimensions definition in the context of e-commerce live streaming. Our findings will also help marketing managers in developing and designing a high-level service strategy of live video streaming.

This study has several limitations that can be addressed in future research. Firstly, as our sample data are collected mainly from college students, the generalisability of our findings may be limited. Future research can increase the sample size and replicate the study with different groups. Secondly, our study mainly focusses on the impact of information quality and interaction quality on swift *guanxi*. Future research may discuss more antecedents that improve the swift *guanxi* between customers and e-retailers on LSP. Thirdly, our study does not consider the factors that may moderate the relationship among information quality, interaction quality and purchase intention. Future studies should consider some individual- and product-related traits as moderators, such as self-construal (interdependent vs independent) and product type (experience vs search). Finally, our study focusses on the swift *guanxi* among customer-live streaming retailers. In fact, information quality and interaction quality are also driven by other customers given the "triadic" nature of e-commerce live streaming. Further research may consider the features and influence of customer and other customers' interaction.

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Appendix

Constructs and items

- 1 *Believability (BEL)* (Cheung et al., 2008; Lee et al., 2002)
 - BEL 1. The information on LSP is trustworthy.
 - BEL 2. The information on LSP is reliable.
 - BEL 3. The information on LSP is believable.
 - BEL 4. The information on LSP is sincere.
- 2 *Usefulness (USE)* (Cheung et al., 2008; Erkan and Evans, 2016)
 - USE 1. The information on LSP is valuable.
 - USE 2. The information on LSP is informative.
 - USE 3. The information on LSP is helpful.
 - USE 4. The information on LSP is useful.
- 3 *Vividness (VIV)* (Zhang et al., 2018; Orús et al., 2017)
 - VIV 1. The information on LSP has stimulated my senses (sight, hearing, etc.).
 - VIV 2. The information on LSP is clear.
 - VIV 3. The information on LSP is concrete.
 - VIV 4. The information on LSP is realistic.
 - VIV 5. The information on LSP is colourful.
- 4 *Responsiveness (RES)* (Akter et al., 2019; Gorla et al., 2010)
 - RES 1. Retailers on LSP are always willing to help me.
 - RES 2. Retailers on LSP show an interest in solving my problems.
 - RES 3. Retailers on LSP provide service right at the first time.
 - RES 4. Retailers on LSP tell me exactly when services will be performed.
- 5 *Empathy (EMP)* (Gorla et al., 2010; Ananda and Devesh, 2019)
 - EMP 1. Retailers on LSP give me individual attention.
 - EMP 2. Retailers on LSP understand my specific needs.
 - EMP 3. Retailers on LSP provide convenient operating hours.
 - EMP 4. Retailers on LSP offer personalized service to me.
- 6 *Real-time interaction (RTI)* (Etemad-Sajadi, 2016)
 - RTI 1. LSP allows me to interact with retailers to receive information.
 - RTI 2. LSP has interactive features to meet my needs.
 - RTI 3. LSP allows me to easily find the desired information without having to call the retailer.
 - RTI 4. LSP allows me to easily find the desired information without having to write an email to the retailer.
 - RTI 5. The interaction with the retailer on LSP is efficient.
- 7 *Mutual understanding (MU)* (Ou et al., 2014)
 - MU 1. We can understand each other's needs.
 - MU 2. We can understand each other's point of view.
 - MU 3. We can make ourselves heard.
 - MU 4. We can follow the flow of the conversation.
 - MU 5. We show interest in each other's opinions.

- 8 *Reciprocal favours (RF)* (Ou et al., 2014)
 - RF 1. If I buy from this retailer on LSP, he/she would provide a discount to me.
 - RF 2. We provide a positive rating or comment to each other.
 - RF 3. We help each other.
 - RF 4. We proved we were friends by doing a favour for each other.
- 9 *Relationship harmony (RH)* (Ou et al., 2014)
 - RH 1. We maintain harmony.
 - RH 2. We avoid conflict.
 - RH 3. We respect each other.
- 10 *Purchase intention (PI)* (Hong and Cha, 2013)
 - PI 1. I would like to purchase a product from this retailer on LSP.
 - PI 2. I would like to recommend my friends and family to purchase products from this retailer.
 - PI 3. If there is a product that I want to purchase, I would like to purchase from this retailer.

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