「정보시스템연구」 제30권 제3호
한국정보시스템학회
2021년 9월, pp. 01~20

http://dx.doi.org/10.5859/KAIS.2021.30.3.1

How Companies Persuade Active Participation of Consumers on Live Streaming Commerce? S-O-R Perspective*

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Ⅰ. Introduction

Many social media platforms and e-retail platforms use live streaming commerce to promote communication between enterprises and customers to improve their performance, and they have achieved good results(Zhang et al., 2019). According to “2019 Taobao. com Live Streaming Ecological Development Trend Report”, the revenue of live streaming commerce exceeded $15.6 million in 2018.

Compared with traditional e-commerce, live streaming commerce can show products and demonstrate how to use them, answer customers’ questions in real-time, and organize entertainment activities to encourage purchase. It improves consumers’ online shopping experience because live streaming commerce

* 이 논문 또는 저서는 2020년 대한민국 교육부와 한국연구재단의 인문사회분야 중견연구자지원사업의 지원을 받아 수행된 연구임(NRF-2020S1A5A2A01041510).
본 연구는 순천향대학교 학술연구비 지원으로 수행하였음.
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can compensate for disadvantages of traditional e-commerce, such as the one-sided presentation of products, the lack of interaction between customers and merchants during the purchasing process, and so on(Wongkitrungrueng and Assarut, 2018).

As a new phenomenon in commerce, live streaming commerce has not yet received sufficient research attention(Sun et al., 2019). Previous researches have explored how live streaming commerce can improve customer loyalty, factors that influence viewers' intention to continue watching live streaming and the motivation to use live streaming (Wongkitrungrueng and Assarut, 2018; Xu et al., 2020; Lee, 2021). From the perspective of IT affordance studies, live streaming can influence consumers' purchase intentions in social commerce(Sun et al., 2019).

Live streaming commerce creates a novel shopping environment and offers a variety of opportunities to stimulate the shopping behavior of potential consumers(Xu et al., 2020). As a deeper understanding of online consumer behavior based on contextual cues becomes increasingly important and it is necessary to explore how environmental factors of live streaming commerce influence consumer behavior(Richard and Chebat, 2016). However, few studies have examined the factors that influence consumer behavior in the live streaming commerce environment (Wongkitrungrueng and Assarut, 2018). To address these research gaps, we proposed three research questions: First, what are the characteristics of live streaming commerce? Second, how does live streaming commerce influence consumers' perceptions and emotions? Third, how do consumers' perceptions and emotions influence their behavior when using live streaming commerce? The S-O-R theory assumes that stimulating cues(stimulus) can trigger a person's(organism) emotional and cognitive process, resulting in a corresponding behavior(response)(Mehrabian and Russell, 1974). In the live streaming commerce environment, the audience receives many stimuli from the environment, which further influence consumers' purchase activities(Xu et al., 2020). Therefore, we use S-O-R theory to explore the factors of the live streaming environment and how these factors influence consumers' behavior.

Ⅱ. Literature Review

2.1 Live streaming commerce

Live streaming commerce refers to a new form of social e-commerce in which e-commerce transactions are conducted via live streaming platforms. It is a comprehensive service business involving information technology and social interaction.

Live streaming commerce creates a virtual space for real-time communication between Sellers and consumers(Xu et al., 2020). The difference between live streaming commerce and traditional e-commerce is as follows: first, the static image information in traditional e-commerce can hardly meet the growing demand of consumers. Live streaming commerce can provide people with information in sound and form, which improves the authenticity and richness of information content. Second, live streaming commerce enables consumers to interact with e-retailers or other consumers using the service at the same time through text dialogs, which increases the interaction between consumers and e-retailers(Zhang et al., 2019). Previous studies on live streaming commerce have suggested antecedents that influence consumer behavior, such as information(mutual timeliness, entertainment, usefulness), anchors (reliability, charisma, intimacy), purchase value(hedonic value, utilitarian value), trust (trust in products, trust in retailers), heart distance, perceived uncertainty and the impact of consumers' attitudes and purchase intentions toward live streaming commerce (Wongkitrungrueng and Assarut, 2018; Zhang et al., 2019; Lee, 2021). Since external stimuli can influence Internet users' behavior(Xu et al., 2020), it is necessary to understand the factors that influence users' behavior in live streaming commerce, a new type of social e-commerce.

2.2 S–O–R Model

The S-O-R(stimulus-organism-response) theory can be interpreted to mean that stimulus cues can trigger an individual's(organism's) emotional and cognitive processes, resulting in behaviors (responses)(Mehrabian and Russell, 1974). The reasons for choosing S-O-R theory as the theoretical framework for our study are as follows: First, S-O-R theory is widely used in consumer behavior research(He et al., 2018). Second, the constructs included and the relationships between them can illustrate well the research content of this study. This theoretical framework helps to explore what contextual cues influence a user's emotional and cognitive decision-making processes, and how the contextual cues and decision-making processes influence users' behaviors in live streaming.

Ⅲ. Research Model

3.1 Live Streaming Commerce Features as Stimulus(S)

Stimulus is defined as "the environment that individuals encounter"(Mehrabian and Russell, 1974). In this study, we use the characteristics of live streaming commerce as a "stimulus"

that influences the activation of individual psychological characteristics and behavioral responses. Three factors induced viewers to watch live streaming in person, including the characteristics of the media, the characteristics of the situation, and the characteristics of the content(Lee et al., 2018). The uniqueness of live streaming commerce is that consumers can interact with traders in real time (Wongkitrungrueng and Assarut, 2018). Therefore, we also considered the real-time interaction characteristics of live streaming commerce in this study.

3.1.1 Content Attributes

Following previous literature, in this study, we combine the characteristics of e-commerce and live streaming commerce to divide the content attributes into authenticity, amusement and transparency(Yang and He, 2011; Zhou et al., 2018; Zhang, 2019). Authenticity in this study refers to the extent to which consumers believe that the representations of live streaming commerce are authentic. Live Streaming commerce shows the reality of the company and the products offered, which is considered as more realistic(Wongkitrungrueng and Assarut, 2018). In live streaming commerce, consumers can directly see the appearance of the sellers and the background of the broadcast and communicate with the sellers face to face. Perceived authenticity has a positive influence on behavioral intentions in tourism consumption(Yang and He, 2011).

Amusement is an activity that maintains the audience's attention and interest, and it has become an increasingly important retail strategy(Zhang, 2019). Entertainment content is an important criterion for judging the value of media(Zhang and Park, 2018). In mobile advertising, entertainment has a positive influence on the attitude and reliability of advertising(Jeun and Lee, 2012).

Transparency was defined as the visibility and accessibility of information in this study. In traditional e-commerce, consumers could not explicitly learn about products before purchasing because they are separated in time and space from merchants and products. Therefore, information transparency is important for their purchase and consumption decisions. Information transparency has been identified as a key factor influencing consumers' purchase behavior in e-commerce (Zhou et al, 2018). To explore the effects of authenticity, amusement and transparency on consumer arousal, we established the hypothesis as follows:

H1: Content attributes are second-order constructs of authenticity, amusement and transparency. The content attributes of live streaming commerce have a positive impact on consumer arousal.

3.1.2 Real-Time Interaction

Interactivity is one of the most important

features of new media(David and Roy, 2005). Live streaming commerce allows consumers to interact with merchants in real time, resulting in a more lively shopping experience and more interpersonal relationships(Lee, 2021.). While online shopping has led to e-retailers and consumers being physically separated from each other, a high level of social presence gives consumers a sense of companionship and humanity even without real interpersonal contact(Gefen and Straub, 2004). Therefore, we mainly consider the role of self-reference, social presence, and perceived interactivity in real-time interactive features of live streaming commerce. Self-reference has been described as a cognitive process in which individuals associate self-relevant incoming information with information previously stored in memory (Choi et al., 2017). When consumers interact with advertising information, they engage in cognitive processes that help them understand the information in the advertisement by comparing it to self-relevant experiences they have already stored in their memory. Self-reference can reinforce the audience's good impression of the advertisement and thus improve the audience's buying behavior(Gao et al., 2017). The most important effect of interaction is social presence(David and Roy, 2005). In live streaming commerce, consumers can simultaneously communicate with the moderator or other consumers through the text dialog box. Social presence affects mobile social network services, and it has been found that it can help users enjoy and continue to use their intentions(Choi et al., 2017). In addition, the perception of social presence in the online environment has a positive effect on users' trust and intentions(Gefen and Straub, 2004).

Perceived interactivity was defined as the extent to which users view their experiences as simulating interpersonal interactions and feel they are engaging with others. It is important in attracting and retaining online users. Perceived interactivity has a positive influence on usage intentions when using information systems(Yi, 2018). Interactivity can significantly improve user satisfaction(Lee, 2021). To investigate the effects of self-reference, social presence and perceived interactivity on consumer arousal, we hypothesized the following:

H2: Real-time interaction is a second-order construct of self-reference, social presence, and perceived interactivity. The real-time interaction of live streaming commerce has a positive impact on consumer arousal.

3.1.3 Media Characteristics

Anyone can publish live streaming media content or watch live streaming content created by others via the Internet, the popularity has increased(Zhao et al., 2018). In this study, the media characteristics of live streaming are mainly about its mobility and convenience. Mobility refers to the extent to which a mobile

service is not constrained by place and time of use. Mobility is one of the most important factors in providing customers with an optimal shopping experience in a retail store(Tseng and Yazdanifard, 2015). Consumers have a better experience when they store using mobile devices, which promotes customer enthusiasm. Therefore, mobile technology has a significant positive impact on the willingness to continue shopping(He et al., 2018). Convenience refers to the users who can easily operate the system. It affects the acceptance of a system when users think that the system is difficult to operate(Kim, 2018). Convenience can affect user satisfaction, it is the most important factor for a good shopping experience(Jeun and Lee, 2012). To investigate the influence of mobility and convenience on consumer arousal, we established the hypothesis as follows:

H3: Media characteristics are the second-order construction of mobility and convenience. The media characteristics of live streaming commerce have a positive influence on consumer arousal.

3.1.4 Situational Characteristics

In addition to the characteristics of consumers and the products themselves, the environmental factor is one of the situational factors that influence consumer behavior (Mehrabian and Russell, 1974). In live streaming commerce, retailers often use some selling methods such as limiting the purchase time, limiting the number of products that can be purchased, or offering provisional coupons to attract consumers and promote sales. Therefore, scarcity of time, scarcity of quantity and provisional coupons were analyzed as situational characteristics of live streaming commerce to investigate their effects on consumers' perceptions in this study.

Scarcity of time means that consumers can only buy products within a certain period of time; scarcity of quantity means that the promotional offer is only for a certain number of products(Lee and Choi, 2014). The scarce information often creates a sense of urgency for people to buy products(Eisend, 2008). And in e-commerce, advertising that emphasizes scarcity can effectively increase consumers' purchase intentions(Lee and Choi, 2014). A coupon is a certificate that provides consumers with an incentive to purchase a product or service. For consumers, information about discounts is an important factor in purchase decisions(Araújo et al., 2015). Consumer satisfaction with coupons affects satisfaction and continued use of social commerce websites(Jang et al., 2013). To explore the effects of scarcity of time, scarcity of quantity and provisional coupons on consumer arousal, we hypothesized the following:

H4: Situational characteristics are the second-order construction of scarcity of time, scarcity of quantity and provisional coupon. The situational characteristics of live streaming

commerce have a positive influence on consumer arousal.

3.2 User Perception as Organism Experience(O)

3.2.1 Arousal

Arousal refers to the extent to which a person feels stimulated, activated, or awake (Mehrabian and Russell, 1974). In live streaming commerce, various stimuli such as content features, real-time interaction, and marketing strategies are used to meet viewers' needs and arouse their enthusiasm to participate in various commercial activities(Xu et al., 2020). According to the S-O-R theory, emotional responses(pleasantness and arousal) evoked by external stimuli can influence perception(cognition) and perceptual behavior. Perceived risk is the result of a cognitive process and is therefore inevitably influenced by emotions(Ma and Wang, 2009). People feel more confident, optimistic, and unconstrained when they experience positive emotions (Richard and Chebat, 2016). Therefore, users with positive emotions are more likely to engage in exploratory behaviors or try new products. Positive emotions lead users to identify with live streaming commerce, and not rationally evaluate the content of live streaming commerce, so they are not sufficiently aware of the potential risks. Previous research has found that positive emotions reduce the perceived risk of online decision support(Ma and Wang, 2009). Based on the above, we have made the following hypothesis:

H5: Consumer arousal has a negative impact on perceived risk.

3.2.2 Flow

In this study, flow is defined as the state in which people focus on live streaming commerce and are not easily disturbed by the outside world(Richard and Chebat, 2016). People who have more positive emotions may have better flow experiences, and flow experiences can attract consumers and significantly influence their attitudes and usage behaviors. When consumers have a flow experience that is best, they can enjoy it and look forward to experience it again(Siekpe, 2005). Based on the above, we established the hypothesis as follows:

H6: Consumer arousal has a positive effect on flow.

H8: Flow has a positive effect on the intent to reuse.

3.2.3 Perceived Risk

Risk refers to the uncertainty of the outcome of a set of behaviors(Son and Lee, 2003). In e-commerce, uncertainty is more likely to occur and trigger risk than in offline marketing because the information asymmetry between

retailers and customers increases the likelihood that customers perceive risk when they purchase products online(Ma and Wang, 2009). Although live streaming commerce can present products in more detail than traditional e-commerce, consumers could not directly touch and examine products before purchase, which is likely to increase consumers' uncertainty about the consequence of purchase. Perceived risk is negatively correlated with behavioral intention and is the main barrier to consumer'' purchase intention when shopping online(Son and Lee, 2003). Based on the above, we hypothesized the following:

H7-1: Customers' perceived risk in live streaming commerce has a negative influence on active participation.

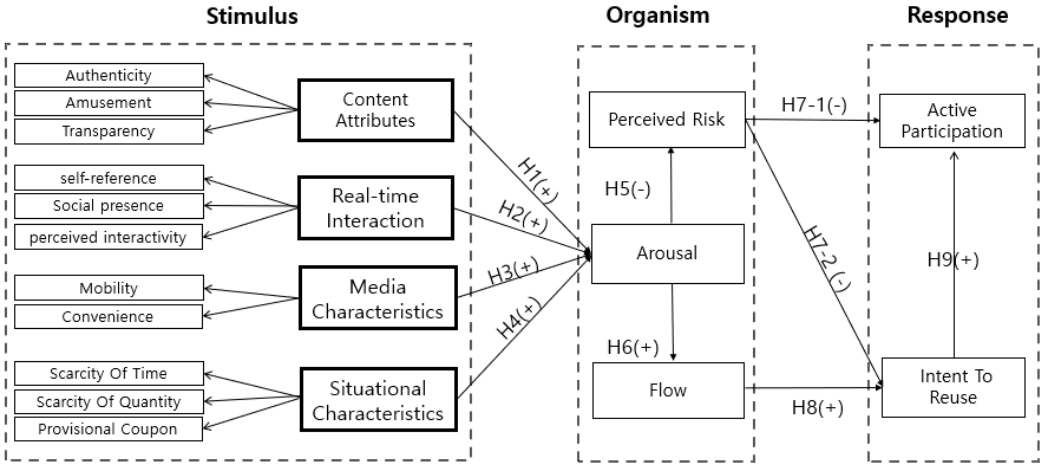
H7-2: Customers' perceived risk in live streaming commerce has a negative influence on reuse intention.

3.3 Response (R)

3.3.1 Intent to Reuse

Reuse intention refers to the intended reuse of services or products that customers currently use(Kang and Moon, 2017). Previous studies have examined factors that influence reuse intention(Shin and Kim, 2010). In this study, it is assumed that consumers who intend to use or continue to use live streaming commerce will more actively search for the programs they want to watch. Furthermore, since merchants distribute coupons from time to time during live streaming commerce, this will trigger a positive interaction between consumers and the provider. Based on the above discussion, we hypothesized the following:

H9: Intention to reuse in live streaming commerce has a positive impact on consumers' active participation.



<Figure 1> Research model

3.3.2 Active Participation

Active participation is a necessary condition for a successful online community(Koh and Kim, 2004). In this study, active participation is defined as the extent to which consumers actively participate in live streaming commerce. The success of online communities depends on active members in the community(Kang et al., 2014). Based on the previous discussions, we built the research model for this study as shown in <Figure 1>. The research model has four stimulus sources: Content attributes, real-time interaction, media characteristics, situational characteristics. And these four constructs are used as second-order factors.

Ⅳ. Research Methodology

This study conducted an online questionnaire among consumers who observed Taobao Live Streaming commerce in China. Taobao.com, the largest online shopping platform and one of the first online trading platforms to introduce “live streaming commerce” in China.

To ensure the validity of the measurement object, we used scales from the published literature and modified them according to the research content of this paper. This investigation was conducted in China. The Chinese version of the questionnaire was revised by a Chinese researcher who speaks English well. Before the formal investigation, three non-academic researchers examined and revised complicated words in the questionnaire to create the official questionnaire. The official questionnaire consisted of four parts.

The first part explained the purpose of this study, the identification of the researcher, and the guidelines for completing the questionnaire. The second part contained the items confirming whether the respondents have experience in using live streaming commerce to facilitate the deletion of invalid questionnaires later. The third part contained the 57 items measuring the variables. These items were formulated based on the published works. We used the five-point Likert scale: 1 means “strongly disagree”, 5 means “strongly agree”. The fourth part contained the items used to collect the respondents’ personal data such as gender, age, occupation, education, etc. This survey was conducted anonymously. According to the survey data, 22.4% of the respondents were male and 77.6% were female. The proportion of respondents in the age group of 20-30 years was 51.1%, which means that the group of young people has the highest acceptance and more positive buying attitude towards live streaming commerce. And the group of students makes up the largest proportion of respondents. Most of these respondents had a bachelor’s degree and accounted for 69% of the total sample. This

group is knowledgeable, easily accepts new things and is willing to accept the study. In terms of basic behavior, 55.3% of respondents watch live streaming commerce 3-4 days per week, 61% watch more than 30 minutes per day, and all respondents have purchased products via live streaming commerce in the past three months, with clothing making up the highest percentage at 52.1% of the total sample.

4.1 Measurement Model

The items of the questionnaire in this study were reconstructed based on the published works. To measure the reliability of the items, an exploratory factor analysis(EFA) was first conducted. Then, confirmatory factor analysis(CFA) was conducted to test the discriminant validity of these structures. <Table 1> shows the results.

The result shows that Cronbach's α for each construct is above the recommended threshold of 0.7, indicating higher measurement reliability. If the construct reliability(CR) and all factor loadings are greater than 0.7 and the average variance extracted(AVE) is greater than 0.5, it means that convergence validity is

<Table 1> Convergent Validity[1)]

Factor	α	CR	AVE
Authenticity (Yang and He, 2011)	0.850	0.909	0.770
Amusement (Zhang and Park, 2018)	0.812	0.889	0.727
Transparency (Zhou et al., 2018)	.838	0.902	0.755
Self-reference (Gao et al., 2017)	0.870	0.911	0.719
Social presence (Gefen and Straub, 2004)	0.898	0.929	0.766
Perceived interactivity (Yi, 2018)	0.870	0.911	0.720
Mobility (Kim and Park, 2013)	0.848	0.898	0.688
Convenience (Jeun and Lee, 2012)	0.902	0.932	0.773
Scarcity of time (Lee and Choi, 2014)	0.798	0.881	0.712
Scarcity of quantity (Lee and Choi, 2014)	0.895	0.927	0.760
Provisional coupon (Araújo et al., 2015)	0.863	0.916	0.785
Arousal (Gao et al., 2017)	0.852	0.910	0.772
Flow (Siekpe, 2005)	0.852	0.900	0.693
Perceived Risk (Son and Lee, 2003)	0.878	0.925	0.804
Active Participation (Kang et al., 2014)	0.822	0.880	0.647
Intent To Reuse (Shin and Kim, 2010)	0.797	0.880	0.71

1) authenticity(AUT); amusement(AMU); transparency(TRA); self-reference(SRF); social presence(SPR); perceived interactivity(PIN); mobility (MOB); convenience(CON); scarcity of time(SOT); scarcity of quantity(SOQ); provisional coupon(PC); perceived risk(PR); arousal(ARO); flow(FLO); active participation(AP); intent to reuse(ITR).

good(Fornell and Larcker, 1981). In our study, all the loadings are significant and greater than 0.7, and all the construct reliabilities(CR) in our study are greater than 0.70. The AVE range of values of the variables in this study is between 0.647 and 0.804. The results show that the convergence validity is good. Next, we examined the discriminant validity.

If the square root of its AVE value exceeds the square root of the correlation between this construct and the other latent variables, the construct has discriminant validity(Fornell and Larcker, 1981). The correlation matrix between variables shows that the correlation coefficient between each variable is smaller than the arithmetic square root of the average variance extraction corresponding to each variable on the diagonal, which means that the discriminant validity of the questionnaire is very good. The results are presented in <Table 2>.

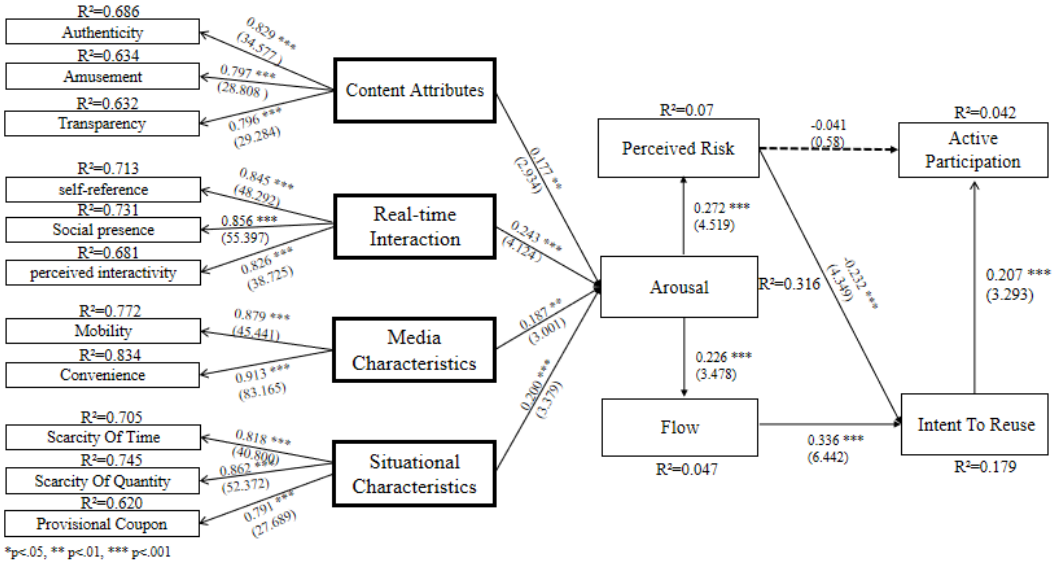
4.2 Structural Models and Hypothesis Verification

We selected Smart PLS 3.0 to test the research model and the corresponding hypotheses. PLS was chosen because it allows the observed variables not to conform to the multivariate normal distribution and allows fast convergence for small sample sizes. We used 5000-repeat bootstrapping to estimate the significance level of the path, and the research model was tested using the t-statistic. <Figure

<Table 2> Inter-construct Correlations[2)]

Factors	AP	ARO	FLO	ITR	PR	AMU	AUT	CON	MOB	PC	PIN	SOQ	SOT	SPR	SRF	TRA
AP	.805															
ARO	.063	.879														
FLO	.126	.226	.833													
ITR	.219	.206	.364	.843												
PR	.098	.272	.122	.273	.897											
AMU	.09	.348	.126	.131	.207	.853										
AUT	.042	.327	.009	.038	.098	.499	.877									
CON	.017	.416	.105	.043	.026	.248	.279	.879								
MOB	.045	.293	.058	.119	.044	.283	.29	.609	.829							
PC	.08	.336	.076	.073	.009	.257	.206	.306	.256	.886						
PIN	.069	.331	.131	.087	.067	.181	.245	.243	.222	.145	.848					
SOQ	.078	.347	.038	.116	.081	.244	.262	.326	.295	.529	.192	.872				
SOT	.024	.349	.013	.054	.073	.31	.328	.291	.294	.523	.068	.536	.844			
SPR	.173	.34	.146	.107	.003	.22	.23	.237	.226	.157	.552	.219	.21	.875		
SRF	.08	.352	.088	.191	.008	.179	.275	.181	.191	.179	.553	.241	.246	.588	.848	
TRA	-.028	.293	.06	-.01	-.021	.449	.487	.201	.255	.234	.176	.286	.317	.182	.176	.869

2) The diagonal in the bolt is the square root of the AVE.



<Figure 2> The Results of the Structural Equation Modeling

2> shows the results.

The R square mainly reflects the degree of interpretation between the latent variable interpretation and the corresponding latent variable. The results show that arousal is 0.316, flow is 0.047, perceived risk is 0.07, active participation is 0.042, and intent to reuse is 0.179, thus having some explanatory power. The path coefficients of content attributes, real-time interaction, media characteristics, and situational characteristics of live streaming commerce on consumer arousal were 0.177 ($p<0.01$), 0.243($p<0.001$), 0.187($p<0.01$), 0.200($p<0.001$), respectively. Therefore, hypotheses H1, H2, H3 and H4 were supported. The results prove that the external environment of live streaming commerce can trigger consumers' positive emotions. The path coefficient between consumers' arousal and perceived risks and flow were 0.272($p<0.001$), 0.226($p<0.001$), respectively. Therefore, hypotheses H5 and H6 were supported. The path coefficient of perceived risk on active participation was -0.041, which was not statistically significant. Therefore, hypothesis H7-1 was not supported. In other words: When consumers watch live streaming commerce, they do not increase their active participation because the perceived risk is lower. The path coefficients of perceived risk and flow to intent to reuse were －0.232($p<0.001$), 0.336 ($p<0.001$), respectively. Thus, hypotheses H7-2 and H8 were supported. The path coefficient from reuse intention to active participation was 0.207($p<0.001$). Thus, hypothesis H9 was supported.

<Table 3> The Result of Indirect Relationship[3)]

Relationship	Indirect Effect	Confidence Interval	t-value
ARO-PR-AP	0.028	(-0.024, 0.073)	1.337
ARO-PR-ITR	0.063	(0.025, 0.111)	2.853

In terms of second-order constructs, the results were that content attributes accounted for a statistically significant 68.6% of the variance in authenticity(0.829; p<0.001), 63.4% of the variance in amusement(0.797; p<0.001), and 63.2% of variance in transparency(0.796; p<0.001); real-time interaction was statistically significant in explaining 71.3% of variance in self- reference (0.845; p<0.001), 73.1% of variance in social presence(0.856; p<0.001), and 68.1% of variance in perceived interactivity(0.826; p<0.001); the media characteristics explained statistically significantly 77.2% of variance in mobility(0.879; p<0.001) and 83.4% of variance in convenience(0.913; p<0.001); the situational characteristics statistically significantly explained 70.5% of the variance in scarcity of time(0.818; p<0.001), 74.5% of the variance in scarcity of quantity(0.862; p<0.001), and 62% of the variance in provisional coupon(0.791; p<0.001). The Bootstrapping program has also been used to test mediation effects(Preacher and Hayes, 2008). Bootstrapping of 5000 samples was used to calculate the significant mediation effect of perceived risk. The result is shown in <Table 3>. Perceived risk had no mediating effect between arousal and active participation because its confidence interval was(-0.024, 0.073). The presence of mediating effects is judged by the fact that the 95% bootstrap confidence interval does not span 0 between the upper and lower intervals(Preacher and Hayes, 2008).

Ⅴ. Conclusions

Based on S-O-R theory, this study uses Taobao.com as an example to examine the effects of environmental stimuli(content attributes, real-time interaction, media characteristics and situational characteristics) in live streaming commerce on consumer perception and behavior. First, the results showed that the content attributes(authenticity, amusement and transparency) of live streaming commerce have a significant positive impact on consumer arousal(H1). This result is consistent with previous studies(Zhou et al., 2018). In other words: When the content presented in live streaming commerce is authentic and interesting, consumers can better understand the product, which can increase

3) Arousal (ARO), Perceived Risk (PR), Active Participation (AP).

their trust faster and arouse more positive emotions. Second, real-time interaction (self-reference, social presence and perceived interactivity) in live streaming commerce has a significant positive impact on consumer arousal(H2). The users with strong social emotions are more likely to experience positive emotions(Gao et al., 2017). Therefore, during the live streaming process, e-commerce merchants can focus on communicating with consumers to make them feel valued and develop positive emotions.

Third, the media characteristics(mobility, convenience) of live streaming commerce have a significant positive impact on consumer arousal(H3). This result is consistent with previous studies(Tseng and Yazdanifard, 2015; He et al., 2018). Fourth, the situational characteristics(scarcity of time, scarcity of quantity and provisional coupon) of live streaming commerce have a significant positive influence on consumer arousal(H4). This result was also confirmed by previous studies. Scarcity of information or time has a positive influence on consumer arousal(Lee and Choi, 2014). Fifth, consumer arousal has a positive impact on perceived risk and purchase flow(H5)(H6). Consumers' positive mood while shopping online can directly mitigate their perceived risk level(Ma and Wang, 2009). Sixth, perceived risk has a negative influence on reuse intention, while flow has a positive influence on reuse intention(7-2)(H8). This result was also confirmed by previous studies. Perceived risk has a significant negative influence on online shopping behavior(Son and Lee, 2003). In predicting user acceptance of online games, flow experience was found to be related to intention to use the system(Ma and Wang, 2009). Seventh, intention to reuse has a positive influence on active participation (H9). This result is somewhat different from previous studies. In the context of the web, customer participation has a significant positive influence on repurchase intention(Son and Lee, 2003). Consumers' individual and psychological factors influence consumers' behavior(Kang and Moon, 2017). Consumers who intend to continue using live streaming commerce may actively search for the program they want to watch and actively interact with the presenter or other consumers because of the wide range of products, accurate information, or the pursuit of entertainment. In addition, various methods of sales promotion introduced from time to time by retailers during live streaming commerce may encourage consumers to watch and participate in the program on an ongoing basis. Eighth, perceived risk negatively affects active participation(7-1). This result was not supported. It means that consumers will not actively participate in live streaming commerce due to lower perceived risk. There are two reasons for this result: first, it may be due to the different motivations of consumers. Some

consumers only use live streaming commerce as entertainment. Second, it could be related to consumers' buying impulses. It could be because in live streaming commerce, the novel selling form, the encouragement from the presenter and the coupons given out by the merchants stimulate users' impulsive emotions. Impulsive people tend to react quickly and without a plan, regardless of whether these reactions have negative effects on themselves or others(Amos et al., 2014).

The theoretical contributions of this study can be summarized as follows: First, live streaming commerce is an emerging research topic. Therefore, our study adds to the current literature on live streaming commerce and e-commerce research. Second, we investigated the effects of real-time interactive features and contextual features of live streaming commerce on consumer arousal. In addition, the content characteristics of transparency and authenticity were added for analysis and validation, which expanded the range of variables. Third, research findings have shown that consumers' willingness to reuse in live streaming e-commerce encourages consumers to actively participate in activities and reinforces literature research on active participation.

The practical contributions of this study can be summarized as follows: We found that the real-time interactive function has the greatest impact on consumers' emotions, so it is necessary to pay attention to positive interaction with consumers during live streaming commerce. Since live streaming commerce can last 1 to 2 hours or longer, traders can mobilize consumers' enthusiasm to watch and promote purchase through coupons, scarcity of time or scarcity of quantity during live streaming commerce to draw customers' attention. In addition, companies should pay attention to the quality of live streaming commerce, because this study showed that authentic and entertaining content can increase consumers' positive emotions.

This study has some limitations. First, we only studied live streaming commerce on Taoba.com, and our respondents all had the same cultural background. Therefore, the study could be extended to other e-commerce platforms or countries in the future to investigate the impact of cultural factors on consumers' perceptions of live streaming commerce. Second, in this study, we only analyzed the external environmental stimuli of live streaming commerce. Future studies could include other factors in the analysis. For example, more and more celebrities use live streaming commerce to promote products, so the celebrity effect could be considered in future studies. Third, we only analyzed the effects of live streaming commerce on consumers' emotions and behaviors. Future studies could examine consumers' attitudes toward live streaming commerce. Fourth, influencer marketing is currently developing

rapidly. Future studies could compare the impact of these two forms of marketing on consumers. Fifth, we used the structural equation model in this study. Future studies could use other research methods such as big data analysis.

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장 수 평 (Zhang, Xiu Ping)

순천향대학교 경영학과 박사 과정 학생이다. 주요 관심분야는 디지털 마케팅, 소셜미디어, 온라인 소비자 행동 등이다.

최 재 원 (Choi, Jae Won)

가톨릭대학교 경영학사, 석사, 박사학위를 취득하였다. 현재 순천향대학교 경영학과 부교수로 재직하고 있다. 주요 관심분야는 빅데이터분석, 지능형의사결정시스템, 데이터마이닝, 소셜 네트워크 분석, 디지털마케팅, 모바일 추천 시스템 등이다.

<Abstract>

How Companies Persuade Active Participation of Consumers on Live Streaming Commerce? S-O-R Perspective

Zhang, Xiu Ping · Choi, Jae Won

Purpose

Live streaming commerce refers to the fact that people receive live audio and live video directly over the net. While some e-retailers use Live Streaming as a marketing strategy, the impact of live streaming commerce on customers' reuse intentions is unknown. The purpose of this study is to discuss the impact of live streaming commerce by external environmental factors based on S-O-R theory.

Design/methodology/approach

In this study, we developed a research model based on the S-O-R theory. Using the questionnaire survey method, consumers who used live streaming commerce on Taobao.com were taken as research subjects. Our research model aims to find out how content attributes, real-time interactions, media characteristics, and situational characteristics as stimulus factors influence consumers' perceptions and thus reuse intentions.

Findings

The results of the analysis show that external environmental factors have a significant impact on consumer perceptions and that perceived risks and flows can influence consumers' reuse intentions. In addition, we also examined the impact of reuse intentions on consumers' active participation. These results show that live streaming commerce can influence consumer perceptions and behavior in several ways.

Keyword: Live Streaming; intent to reuse; active participation; S-O-R model

* 이 논문은 2021년 5월 30일 접수, 2021년 6월 9일 1차 심사, 2021년 7월 20일 2차 심사, 2021년 8월 5일 게재 확정되었습니다.