

The Future of e-Commerce: Live Stream Shopping and Purchase Intention Post-COVID-19

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ABSTRACT

From the perspectives of IT Affordances, this paper attempts to explore the influence of the characteristics of live streaming on purchase intention, and to consider the elements required for live streaming service and customers' perceptions thereof in post-COVID-19. Through empirical research, this study establishes a framework emphasizing the major factors promoting customer immersion and the moderating effect of situational involvement that contributes to customer purchase intention in a live stream commerce context. The research model was tested using structural equation model analysis. Based on 428 valid responses, we identify that the quality of live streaming has a direct significant effect on customers' purchase intention. Specifically, relationship between platform stability, customer relationship, anchors' professional knowledge, and purchase intention is significant positive from the Affordance perspectives. The results emphasize the importance of platform stability which allows real-time communication, in-depth interaction, and real scenes for the benefits of sellers using such internet platforms.

Keywords: Live Stream Shopping, Situational Involvement, Consumer Immersion, Purchase Intention, IT Affordance.

1. INTRODUCTION

The COVID-19 pandemic has accelerated technology adoption, helping to shape a "new normal" for societies worldwide. As companies look towards the post-pandemic era, what lessons of technology adoption can they learn from the pandemic experience?

Taobao Live, integrated with the online shopping platform Taobao, is the dedicated live streaming channel of the Chinese multinational Alibaba Group. It allows companies to share live video content and answer customers' questions in real-time. During the pandemic, with many companies forced to close their physical stores, Taobao Live has seen a massive increase in popularity and has become one of the biggest e-commerce platforms in China. According to Alibaba's financial report for the third quarter of the fiscal year 2021, Taobao Live has realized substantial development over the past two years, with its gross merchandise volume (GMV) from live streaming exceeding 400 billion yuan by the end of 2020 [1].

In the context of the pandemic, Taobao Live is an excellent tool for traditional brick-and-mortar companies to adapt to changing norms by creating an online presence. For example, it is helpful for businesses that sell large, expensive products which customers generally prefer to see in person before purchasing such as cars and large home appliances [1]. As the case of Taobao Live shows, adopting modern technology has the potential to improve businesses' efficiency and cost-effectiveness after the pandemic. Since new live streaming applications continue to appear, customers' shopping behaviors are likely to change. Post-COVID-19, the factors influencing such behaviors may differ from those identified in past studies. To help improve live streaming services after the pandemic, this study attempts to establish a framework of exploring the essential factors that may help promote customers' immersion in live stream shopping through the lens of situational involvement and to visualize the impact of these elements on customers' purchase intention.

This study had three objectives. First, via a literature review, we sought to determine the influence of the characteristics of live streaming on purchase intention from the perspectives of affordances and customer immersion. Second, our study considered the elements required for live streaming services and customers' perceptions thereof. To achieve this goal, we developed a framework emphasizing the influential factors of affordances and the moderating effect of involvement contributing to customer immersion. Third, we aimed to identify through empirical research both the antecedents and the results of customer immersion in the context of Taobao live streaming. To help inexperienced merchants benefit from live streaming, we explored the factors that may promote customers' immersion in live stream shopping, focusing on situational involvement. We visualized the impact of these elements on customers' purchase intention. The rationale for our conceptual development is as below.

2. CONCEPTUAL DEVELOPMENT

2.1 Affordance theory

"Affordance" is defined as the possibility of forming concrete behavioral results and relationships between users and environmental cognition on the network platform [2]. With its origins in ecological psychology literature, affordance theory, in its broadest sense, explicates how an environment provides possibilities for users' actions [3]. It

considers the user–environment (e.g., fish–river) system and the affordances of artifacts (such as mobile apps) for users [4]. Since its initial and widespread adoption by psychologists, affordance theory has been applied in various disciplines to explore and model the concrete behavioral outcomes of environmental cognition among users on a network-based platform. This platform can be a piece of technology or software where users are connected with other members of a community to create mutually beneficial opportunities [2]. The theory was applied in research areas of tourism [5], education [6], information systems [7] [8], and social media [9]. Recent studies [10] affirmed the usefulness of affordance theory in directing service design to enhance customer interaction. In the social commerce context, [11] used the idea of social commerce affordances to identify how quickly “guanxi” is formed between users and sellers in the Chinese context. “Guanxi” is emphasized in Chinese culture to describe an individual's social network of mutually beneficial personal and business relationships.

In social commerce, affordances derive from the relationship between customers and IT features [12]. When customers engage in live stream shopping, the features of the live streaming platform which they encounter, shape their perceptions of that platform. [13] have explored how the IT affordances of a social commerce platform build strong or weak ties between customers and sellers. Because affordances reflect the links between people and technology, affordance theory compensates for the limitations of approaches which only focus on customers or platforms [13]. Studying affordances allows researchers to consider technical features and customer perceptions together for a complete understanding [2] [7] [13]. Therefore, this study explored how live streaming influences customers’ purchase intention from the perspective of affordances, shedding light on how we can improve live stream shopping services.

2.2 Elements of Affordance

The literature has shown that affordances have different attributes, suggesting that they have other ways to influence user behavior and achieve objectives in a well-defined environment [14]. Affordance characteristics may vary with context [15]. In the context of social commerce, [12] suggested that IT affordances include i) visibility affordance, ii) metavoicing affordance, and iii) guidance shopping affordance.

Dong, et al. [16] explained that visibility affordance satisfies the customer’s need to see products when participating in social commerce activities visually. The required technical capability for visibility affordance is to provide customers with visible product information. Platform stability is about the functions and technologies of the platform (including platform structure, content operation process, and system). On live stream shopping platforms, streamers explain the details of products and how to use them in real-time through an internet platform that is technically appropriate for its intended purpose [17] [18]. We, therefore, propose that platform stability which refers to high-quality and effective website interface design, is an essential factor influencing visibility affordance in the live stream shopping context.

Metavoicing affordance is the possibility that customers can respond to the product content and the seller's feedback on the product [16]. It allows customers to ask about and obtain valuable information about their target products, and the required technical capability for metavoicing affordance is a function for customers to post comments. In a live stream shopping environment, customers can communicate with streamers and make comments in chat rooms or via bullet screens which display real-time comments from viewers to fly across the screen like bullets [19] [20]. Customers can respond and ask streamers for further information about products in real-time. This kind of connection created between an enterprise and its customers is the customer relationship necessary for achieving business objectives [21]. Thus, this study proposes that a good customer–seller relationship is an essential factor influencing metavoicing affordance in the live stream shopping.

Guidance affordance provides customers with personalized and cooperative services to help them find desirable products. The required technical capability for guidance shopping affordance is a function for giving personalized advice to customers [16]. Through instant and intense interaction between customers and streamers, companies can offer better service and even personalized services easily and quickly to customers in response to their needs in the online shopping environment. Thus, we theorized that access to professional knowledge through shopping guidance is an influential factor in the live stream shopping context.

Based on the above discussion, we hypothesized that i) platform stability, ii) the customer relationship, and iii) the seller's professional knowledge are essential factors influencing the quality of live stream shopping services and ultimately affecting customers' purchase intention.

2.3 Involvement

Empirical evidence supports that high-quality and effective website interface design creates vivid sensory and behavioral experiences that enhance customers' involvement with online shopping. Online shoppers who are more involved with a website may be more willing to spend more time searching for information on the site and further engaging with the online retailer. Kim, et al. [22] resolved that involvement grants customers the ability and motivation to stay longer and initiate more product-related conversations with others. We, therefore, hypothesized that when customers are more involved in the shopping process, they have a greater desire to shop, have a more substantial purchase intention, and are more likely to purchase products online.

According to Kim, et al. [22], being the perceived personal relevance of a product, involvement can be either situational or enduring based on an individual customer's needs, interests, and values. Situational involvement is a temporary elevation of a customer's interest in a product, which usually occurs within the time frame of a purchase decision. In contrast, enduring involvement is a stable phenomenon representing the customer's interest in the product over a long period.

MacKenzie, et al. [23] suggested that the importance of customer's involvement when making a purchasing decision is likely to be most representative of the variance in customer involvement. In this condition, it is even more than product-class involvement concerning only the consumer's involvement with the specific attributes of the product. Therefore, we hypothesized that situational involvement, reflecting the influence of situational factors on individuals' behavior, is associated with online purchase intention.

2.4 Immersion

Bowden [24] defined customer engagement as a psychological process. In video games research, Caroux, et al. [25] summarized engagement as immersion and presence (or perceived realism), during which users experience psychologically through the interaction between themselves and the computer. Recent studies [26] defined immersion as the psychological state that focuses on the current environment, whereas presence is the combination of physical distance and psychological distance between the streamers and customers. Because live streaming is a real-time social media through virtual networks and communities, the physical distance of presence is not considered in this study. Furthermore, the psychological distance of presence intersects with the psychological effect of platform stability, customer relationship, and professional knowledge in our proposed framework. The justifications are in details below.

Base on literature review, the customer relationship with the streamer reflected the psychological distance between the streamer and the customer [21]. As discussed earlier, the connection created between enterprises and customers is the customer relationship necessary for achieving business objectives. This study suggests that a good customer–seller relationship is an essential factor contributing to metavoicing affordance in the live stream shopping context.

Wongkitrungrueng and Assarut [18] contended that professional knowledge of streamers not only has a decisive influence on their fans' purchase attitude, but also significantly improves the purchasing efficiency of customers. Hence, this study proposes that a streamer's professional knowledge can generate a sense of social presence, and can minimize the degree of psychological distance between the customers and the streamer who ultimately affects their purchase intention.

Specifically, platform stability can allow customers to recognize better the information provided by the platform, thereby minimizing any degree of psychological distance. Consequently, high-quality and effective website interface design of platform stability contributes to visibility affordance in the live stream environment [17]. Under this situation, customers feel absorbed in and involved with the live stream stimuli. They experience a sense of blocking out other stimulants from their physical world environment [27].

The framework of “affordance → psychological outcome → consumer behavior” [28] is used to explain our rationale. The affordances implemented in a live stream platform lead to psychological outcomes (immersion) within the forum, and these experiences further lead to purchase intention. In this study, the affordances refer to platform

stability, customer relationship, and professional knowledge. Therefore, this study considers only the mediating effect of immersion which presents the psychological state focusing on the present environment, but not presence which intersects with the psychological outcomes of platform stability, customer relationship, and professional knowledge. Table 1 presents the definitions of the constructs used in the proposed framework (Figure 1).

Table 1. Construct Definitions and Relevant Literature

Construct	Definition	Reference
Affordance	The possibility of specific behavior forms through the cognitive relationship between users and their environment.	Parchoma [2]
Visibility affordance	Function/feature enables customers to understand the product visually.	Dong, et al. [16]
Metavoicing affordance	Function/feature enables customers to respond to the product content and give the seller feedback.	
Guidance affordance	Function/feature that helps customers to make purchase decisions through personalized advice.	
Live streaming quality	The quality of online-sales video streams.	Krishnan & Sitaraman [29]
Platform stability (PS)	The technological characteristics and functions of the platform for high-quality and effective website interface design	Wang [30]
Customer-business relationship (CR)	The connection between an enterprise and its customers is created to achieve its business objectives.	Liu [21]
Professional knowledge (PK)	The professional knowledge of the streamer presents the concepts of professionalism, product involvement, innovation, media usability, and the quality of being sociable.	Meng [31]; Xu [32]
Situational involvement (SI)	The degree to which customers attach importance to products and services in a given situation elicits specific behavior in that situation.	Yang, et al. [33]
Immersion (IM)	A psychological state is characterized by a customer's perception of being immersed in and interacting with an environment that constantly provides stimulation and vivid experiences, which attract and maintain the customer's attention to this environment.	Caroux, et al. [25]; Yim, et al. [27]
Purchase intention (PI)	Customers' willingness to make a purchase.	Lu, et al. [17]

3. THEORETICAL DEVELOPMENT AND HYPOTHESES

3.1 Visibility Affordance and Platform Stability

Live streaming platforms facilitate real-time information exchange, which improves the interaction between the customers and sellers [34]. Ko, et al. [35] maintained that customers' willingness to buy products through online platforms is influenced mainly by the maturity and stability of the platforms and the real-time connectivity they offer. As a result, platform stability can be an essential factor in visibility affordance, leading to the following hypothesis:

H1a. In live stream shopping, platform stability has a positive impact on customer purchase intention

3.2 Meta-voicing Affordance and Customer Relationship

Metavoicing affordance is an informal two-way interaction, which enables customers and sellers to interact with each other, and to provide immediate feedback during the interaction [12]. In the case of Taobao, the relationship between the streamer and customer represents the customer's degree of intimacy. Users can inquire about product details and can comment on a public page or in a chat room. The back-end system records the number of times each user posts comments, makes purchases, and visualizes these figures in terms of intimacy to help sellers understand and guide customers' behavior [19]. Research has argued that interactivity significantly enhances customers' experience on an online platform, which in turn influencing their purchasing behavior [36]. Therefore, the customer-seller relationship can be an essential factor in metavoicing affordance; we thus hypothesized as follows:

H1b. In live stream shopping, the quality of the customer relationship is positively related to customer purchase intention.

3.3 Guidance Affordance and Professional Knowledge

Guidance affordance refers to providing tailored product recommendations and other personalized services based on an understanding of individual customers' interests and preferences [12]. Streamers provide customers with high-quality content based on analyzing their opinions and interactions. They not only attract customers to their products but also adds value to the products perceived by customers [37]. Conveying extensive professional knowledge about the product characteristics and advantages is vital to promoting the purchase intention of customers in the live stream shopping context [38]. A streamer with professional knowledge can pass on the product values and the beliefs for social or self-esteem needs, which are recognized by customers and thus increase customers' interests and purchase intention [20]. Therefore, the streamer's professional knowledge can be an essential factor in guidance affordance. We hypothesized as follows:

H1c. In live stream shopping, the streamer's professional knowledge is positively related to customer purchase intention.

3.4 Live streaming Quality and Customer Immersion

The pleasant mental state generated by immersion can lead to a positive attitude towards products during live stream shopping. Sun, et al. [10] declared that immersion can be investigated in two dimensions: the degree of customer participation and the relationship between the customer and associated marketing activities. Following this, we investigated the effects of customer's situational involvement and the customer-seller relationship, the two dimensions of immersion on purchase intention.

To examine live streaming quality, we applied the elements of i) platform stability, ii) customer-seller relationship, and iii) streamer's professional knowledge. Platform stability refers to the streaming platform's functions and technological characteristics, which mainly include the various functions and technologies of the platform, such as platform structure, content operation process, and system [39]. Higher-quality live streaming platforms are more popular with customers, and platform performance is a significant determinant of live streaming quality [2] [7] [13]. Therefore, it is logical to assume that better platform performance increases customers' situational involvement and immersion by improving streaming quality.

Liu [21] argued that customer relationships are the core content of business survival and development, as loyal customers are vital to a company's long-term profitability. Sun [40] states that Taobao's live platform transcends physical limitations and creates a shared virtual space conducive to customer emotional sharing. For example, besides using intimacy to quantify and visualize the relationship between customers and the platform's services, Taobao gives coupons and makes specific products available when the number of "views" and "likes" reaches a certain threshold. Thus, Taobao's live interface attracts customers, as well as those who just wish to browse the platform, by immersing them in a positive buying atmosphere [20].

According to Gao [41], the streamer's familiarity with a product generates a significant positive impact on customer immersion. Xu [42] supported that streamers' opinions and cognition in a specific field, or their professional knowledge, can effectively guide how customers think and induce purchase behavior. Meng [31] summarized the features expected of a streamer by customers: professionalism, product involvement, innovation, sociality, and media usability. Drawing together the above ideas, we hypothesized as follows:

H2a. Platform stability increases customers' immersion in the live stream shopping environment, which enhancing their purchase intention.

H2b. A better customer relationship increases customers' immersion in the live stream shopping environment, which enhancing their purchase intention.

H2c. A streamer's professional knowledge promotes customers' immersion in the live stream shopping environment, which enhancing their purchase intention.

3.5 Situational Involvement

Involvement in this context refers to the degree to which customers attach importance to products and services in a given situation [33]. In the context of live stream shopping, the perceived risk associated with buying products online affects customers' purchase expectations and choices [43]. In a virtual shopping environment, customers must rely on their imagination to make up for the missing features in the presentation of products, which increases the perceived risk. However, when product interest is high, the negative impact of perceived risk on purchase intention is weakened [44]. When customers are highly interested in a product, they perceive the product having great personal significance. They will spend more time collecting and comparing product information before making a purchase decision [45]. Involvement varies among individuals, and different product types and levels of product involvement lead to differences in customers' perceptions of goods [33]. Based on the literature, involvement has a moderating impact on customer perceptions of the live stream quality and purchase intention. Therefore, we hypothesized as follows:

H3a: In live stream shopping, the greater the situational involvement, the more positively platform stability affects customer immersion and customer purchase intention.

H3b: In live stream shopping, the greater the situational involvement, the more positively the customer relationship affects customer immersion and customer purchase intention.

H3c: In live stream shopping, the greater the situational involvement, the more positively the streamer's professional knowledge affects customer immersion and customer purchase intention.

3.6 Purchase Intention

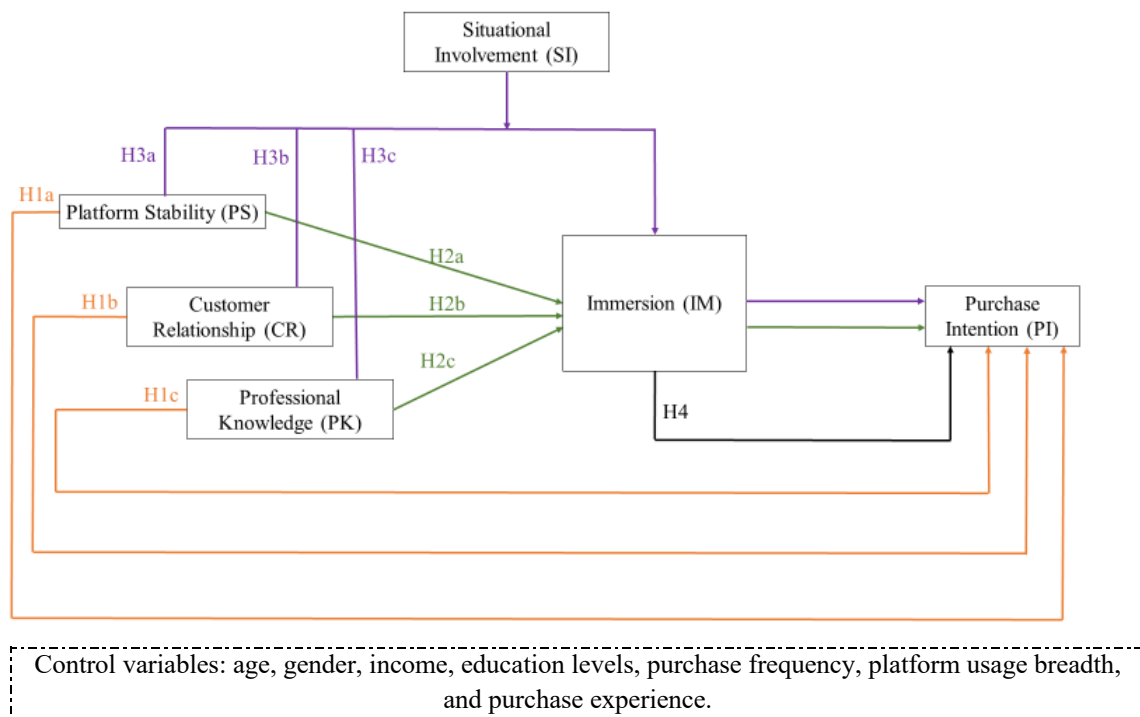
According to Lu, et al. [17], purchase intention refers to the probability of a customer's being willing to make a purchase. In this study, purchase intention refers explicitly to the degree to which customers are ready to buy products or services from the streamer during live stream shopping. Studies have identified two factors that influence purchase intention in this context. The first factor relates to the impact of social media: social media has a positive effect on customers' perceived value and purchase intention through virtual networks and communities offered by computer-based technology [46]. The second factor relates to the interaction between customers and sellers: customers' purchase intention is stronger when customers and sellers have positive interactions and sellers respond quickly to inquiries via live broadcast platforms [47].

Based on literature review, we theorized that platform stability (high-quality and effective website interface design), customer relationship (customer loyalty), and streamers' professional knowledge (opinions and cognition) are essential elements of live streaming quality. This study proposes that by incorporating these qualities in a live stream shopping environment, customers can more easily experience a state of

pleasure when immersed [27], and customers' pleasure will directly influence their purchase behavior [48]. The pleasant mental state generated by immersion can lead to a positive attitude towards products during live stream shopping. Customers will more actively participate in shopping activities and have a more positive attitude toward the products presented by streamers. Therefore, we hypothesized that:

H4. Immersion is positively associated with customer purchase intention.

We developed a conceptual framework for examining the factors affecting customer purchase intention in the live stream shopping context, i.e., “live streaming quality → immersion → purchase intention,” based on the hypotheses above. The control variables included age, gender, income, education level, live stream shopping purchase frequency, platform usage time, and online social commerce purchase experience (see Figure 1).



Notes: This figure shows our conceptual framework for analyzing the factors influencing consumer purchase intention and the relationships between these factors, based on the hypotheses.

Figure 1. A conceptual framework with hypotheses

4. METHODOLOGY

4.1 Questionnaire Design and Data Collection

We designed all of the items of the questionnaire based on previous studies, with minor changes to each item to fit our research context. Because the items were initially devised in English, their translation from English into Chinese was first proofread by an academic in the Department of Translation at the author's university and then verified by e-marketing academic in the Department of Translation at the same university. Three

researchers with relevant research experience translated the items from Chinese back into English to determine the accuracy of the translation. Their feedback confirmed that there were no significant differences between the two versions.

The questionnaire contained two parts: Part I comprised six items with the aim to gather descriptive information on the demographic and other relevant characteristics of Taobao's live stream shopping users, including gender, age, education level, reasons for using the platform, and frequency of using the platform. Part II comprised 26 items (Table 2) covering all of the variables in the study, namely, platform stability (PS), customer relationship (CR), professional knowledge (PK), immersion (IM), and situational involvement (SI). Between three and six items were set for each of the variables, and they were each measured using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Table 2. Questionnaire

Construct	Items	References
Platform stability (PS)	PS1: The platform can stably display video and live broadcasts. PS2: The platform allows me to view live product information. PS3: The platform allows me to view the usage of live products. PS4: The platform allows me to contact and interact with the streamer during live broadcasts stably. PS5: The platform guarantees the reliability and security of payment when I purchase during a live broadcast.	Shao [26]
Customer relationship (CR)	CR1: I feel at ease when purchasing on the platform. CR2: The platform provides a positive return, good exchange and good after-sales service. CR3: Platform service personnel directly handle customer complaints. CR4: Platform service personnel quickly resolve dissatisfaction and problems. CR5: The platform provides personalized care. CR6: Platform sales staff consider problems from my perspective.	Shao [26]
Professional knowledge (PK)	PK1: The platform streamer is an expert in the category of products sold. PK2: The platform streamer has rich product knowledge. PK3: The platform streamer can provide personalized product services based on my requirements. PK4: The platform streamer can sell well in their product category.	Chang, et al. [49]
Immersion (IM)	IM1: The platform's live broadcasts are attractive. IM2: When watching a live broadcast on the platform, I feel involved. IM3: I can focus well when watching a live broadcast on the platform. IM4: When I watch a live broadcast on the platform, I feel like I am in a natural shopping environment. IM5: When I watch a live broadcast on the platform, I forget everything else around me.	Yim, et al. [27]
Purchase intention (PI)	PI1: I start thinking about buying products during live broadcasts on the platform. PI2: I always buy products during live broadcasts on the platform. PI3: I give priority to buying products during live broadcasts on the platform.	Chen, et al. [48]
Situational involvement (SI)	SI1: When I watch live broadcasts on the platform, I am interested in the products shown. SI2: I think the products shown during live broadcasts on the platform are highly relevant to me. SI3: I am keen to buy products during live broadcasts on the platform.	Chang, et al. [49]

4.2 Pre-tests

We conducted two rounds of pre-tests to verify the suitability of the questionnaire's wording. In the first round, we invited five Taobao Live users to fill in the questionnaire and provide feedback on its readability and completeness. Based on their feedback, we adjusted the expression of the three items exploring platform stability and customer relationships without changing the meaning of the items. In the second round, we recruited a commercial survey company to distribute random electronic questionnaires to Taobao Live users to analyze the reliability and validity of the questionnaire. A total of 87 questionnaires were distributed, and 80 (91.95%) valid responses were obtained. Based on the pre-test findings, we made further wording-related changes to ensure the appropriateness of the questionnaire. We administered the official survey through the same survey company over three months in 2021, from early July to the end of September. A total of 800 questionnaires were distributed, and 567 responses were obtained. Out of 567 responses, 428 were considered valid, with all required information completed. The recovery rate was 75.49%.

5. DATA ANALYSIS AND RESULTS

5.1 Descriptive Statistics

Table 3 presents descriptive statistics for the respondents recruited by a commercial survey company that sent out electronic questionnaires to the potential candidates in Mainland China. Among the valid responses who had possessed Taobao Live shopping experience, the proportion of male respondents was the largest, accounting for 53.74% (n = 230). Regarding age, most of the respondents were between 18 and 22 (n = 98, 22.9%). Regarding education level, participants with college or undergraduate education were the largest group (n = 124, 28.97%). Many participants spent less than 1 hour using Taobao Live every day (n = 83, 19.39%). Those who browsed Taobao Live for 3 to 4 hours per day made up the largest proportion (n = 99, 23.13%). Over 35% of the respondents reported that their first shopping experience on Taobao had occurred less than 6 months (n = 73, 17.06%) or between 6 and 12 months before the study (n = 77, 17.99%).

Table 3. Descriptive analysis of respondents

Items	Categories	n	Percentage (%)	Cumulative percent (%)
Gender	Male	230	53.74	53.74
	Female	198	46.26	100.00
Age	18-22 years old	98	22.90	22.90
	23-28 years old	83	19.39	42.29
	29-34 years old	83	19.39	61.68
	35-40 years old	87	20.33	82.01
	Above 40 years old	77	17.99	100.00
Education Level	Junior high or below	80	18.69	18.69
	Senior high (including vocational high school)	107	25.00	43.69
	Junior college or bachelor's degree	124	28.97	72.66
	Master's degree or above	117	27.34	100.00
Average Time of Browsing Taobao daily	Less than 1 hour	83	19.39	19.39
	1-3 hours	72	16.82	36.21
	3-5 hours	80	18.69	54.91
	5-7 hours	71	16.59	71.50
	7-9 hours	65	15.19	86.68
	More than 9 hours	57	13.32	100.00
Average Time of Browsing Taobao Live daily	Less than 1 hour	59	13.79	13.79
	1-2 hours	81	18.93	32.71
	2-3 hours	49	11.45	44.16
	3-4 hours	99	23.13	67.29
	4-5 hours	71	16.59	83.88
	More than 5 hours	69	16.12	100.00
Total Years of Shopping Experience on Taobao (no overlapping among these categories)	Fewer than 6 months	73	17.06	17.06
	6 months to one year	77	17.99	35.05
	1-2 years	70	16.36	51.40
	2-3 years	65	15.19	66.59
	3-4 years	75	17.52	84.11
	More than 4 years	68	15.89	100.00
Total		80	428	100.00

5.2 Data Analysis and Hypothesis Test

5.2.1 Reliability Statistics

Table 4 presents the reliability Test for the dimensions of live streaming quality, including platform stability, customer relations, professional knowledge, immersion, purchase intention, and situational involvement. The Cronbach's alpha values of all these items were greater than the required value of 0.7 [50]. The results indicate that the internal consistency of the questionnaire was good, suggesting good reliability of the survey results.

Table 4. Reliability Test

	Cronbach's Alpha	N of Items
Platform Stability	.862	5
Customer Relations	.897	6
Professional Knowledge	.845	4
Immersion	.877	5
Purchase Intention	.802	3
Situational Involvement	.808	3

5.2.2 Validity Analysis

As shown in Table 5, the communalities of the questionnaire items were higher than the cut-off value of 0.4 [51], indicating that information could be effectively extracted from the questionnaire items. Furthermore, the Kaiser-Meyer-Olkin value was 0.924, which is greater than the 0.6 threshold [52]. This result confirmed that the data had good validity. Additionally, the explained variance rates of the six factors (platform stability, customer relations, professional knowledge, immersion, purchase intention, and situational involvement) were 15.907%, 13.299%, 13.223%, 11.047%, 8.476%, and 6.601%, respectively. The explained rate of cumulative variance after rotation was 68.553%, higher than the 50% threshold [53]. These results support the validity of the research items for extracting information effectively.

Table 5. Validity Analysis

		Factor Loadings						Communalities
	Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	
PS	PS1	0.057	0.041	0.871	0.058	0.111	0.100	0.790
	PS2	0.194	0.112	0.727	0.137	0.114	0.087	0.618
	PS3	0.082	0.183	0.757	0.142	0.071	0.115	0.651
	PS4	0.184	0.111	0.736	0.018	0.092	0.164	0.624
	PS5	0.136	0.212	0.691	0.149	0.159	0.102	0.599
CR	CR1	0.873	0.148	0.084	0.102	0.067	0.049	0.808
	CR2	0.740	0.210	0.117	0.118	0.138	0.124	0.653
	CR3	0.722	0.157	0.150	0.187	0.094	0.188	0.647
	CR4	0.758	0.171	0.146	0.093	0.113	0.123	0.662
	CR5	0.710	0.191	0.103	0.116	0.137	0.166	0.610
	CR6	0.718	0.175	0.155	0.132	0.170	0.041	0.618
PK	PK1	0.122	0.108	0.087	0.885	0.083	0.086	0.832
	PK2	0.228	0.150	0.169	0.727	0.109	0.089	0.651
	PK3	0.102	0.083	0.131	0.782	0.036	0.112	0.660
	PK4	0.148	0.148	0.064	0.717	0.165	0.215	0.636
IM	IM1	0.168	0.865	0.103	0.099	0.013	0.076	0.803
	IM2	0.223	0.741	0.054	0.113	0.125	0.195	0.668
	IM3	0.138	0.744	0.156	0.159	0.088	0.073	0.636
	IM4	0.216	0.724	0.157	0.118	0.103	0.116	0.634
	IM5	0.223	0.732	0.208	0.057	0.127	0.099	0.658
PI	PI1	0.250	0.259	0.234	0.265	0.055	0.741	0.806
	PI2	0.349	0.202	0.340	0.208	0.063	0.563	0.642
	PI3	0.192	0.191	0.232	0.219	0.202	0.717	0.731

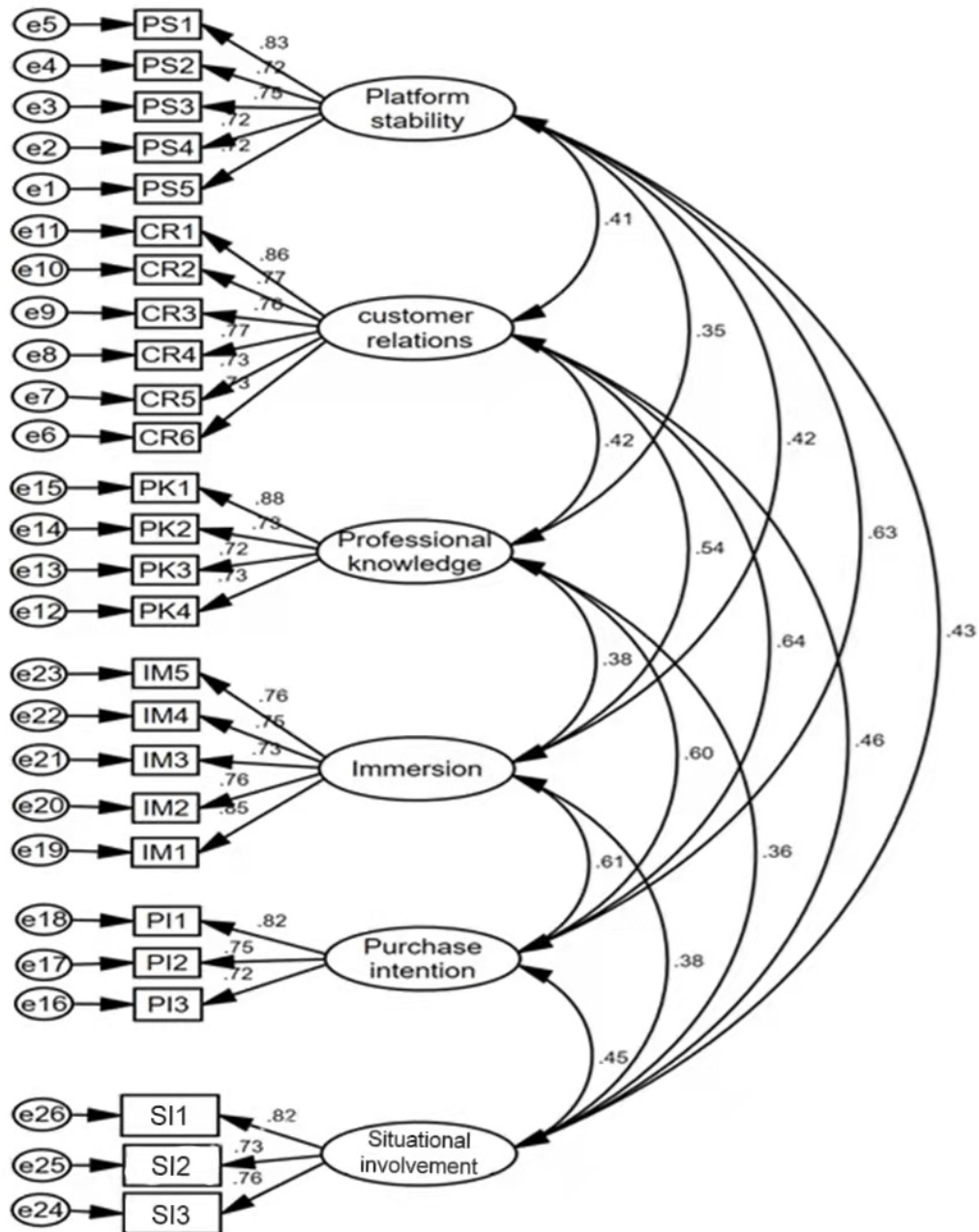
Table 5. Validity Analysis

		Factor Loadings						Communalities
Item		Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	
SI	SI1	0.125	0.082	0.131	0.069	0.876	0.038	0.814
	SI2	0.204	0.101	0.169	0.148	0.761	0.078	0.688
	SI3	0.202	0.177	0.161	0.131	0.744	0.126	0.685
	Eigenvalues (Initial)	9.398	2.235	1.954	1.859	1.510	0.867	-
	% of Variance (Initial)	36.148%	8.596%	7.517%	7.149%	5.809%	3.334%	-
	% of Cum. Variance (Initial)	36.148%	44.744%	52.260%	59.410%	65.219%	68.553%	-
	Eigenvalues (Rotated)	4.136	3.458	3.438	2.872	2.204	1.716	-
	% of Variance (Rotated)	15.907%	13.299%	13.223%	11.047%	8.476%	6.601%	-
	% of Cum. Variance (Rotated)	15.907%	29.206%	42.429%	53.476%	61.952%	68.553%	-
	KMO				0.924			-
	Bartlett's Test of Sphericity (Chi-Square)				5946.502			-
	df				325			-
	p-value				0.000			-

Note: PS: platform stability; CR: customer relationship; PK: professional knowledge; IM: immersion; PI: purchase intention; SI: situational involvement. All factor weights and indicator loadings are significant ($p < 0.001$).

5.2.3 Confirmatory Factor Analysis

The measurement of the factor loadings coefficients revealed a correlation between the factors and measurement items. The standard estimate analyzes the correlation between items. A significant relationship and a standard estimate greater than the accepted value of 0.7 [52] indicate a strong correlation. As shown in Figure 2, all of the factor loading coefficients were greater than 0.7, which confirms strong correlations between the variables.



Note: PS: platform stability; CR: customer relations; PK: professional knowledge; IM: immersion; PI: purchase intention; SI: situational involvement.

Figure 2. Measurement model

5.2.4 Fit indices Analysis

As shown in Table 6, the results of testing model fit were good: a comparison of the model fit data with reference ranges demonstrated that the chi-square fit statistics/degree of freedom (CMIN/DF), normed fit index (NFI), incremental fit index (IFI), Tucker–Lewis index (TLI), comparative fit index (CFI), goodness of fit index (GFI), and root mean squared error of approximation (RMSEA) all met the standards for good model fit.

Table 6. Fit Indices

CMIN	df	CMIN/D F	NFI	IFI	TLI	CFI	GFI	RMSEA
465.82	284	1.64	0.923	0.969	0.964	0.968	0.928	0.039
Recommended Value		1<NC<3	>0.8	>0.8	>0.8	>0.8	>0.8	<0.08

Note: CMIN: chi-square fit statistics; DF: degree of freedom, NFI: normed fit index, IFI: incremental fit index; TLI: Tucker–Lewis index; CFI: comparative fit index; GFI: goodness of fit index

5.2.5 Standardized Regression Coefficient Analysis

As shown in Table 7, composite reliability (CR) and average variance extracted (AVE) values were used to evaluate convergence validity. When the CR value of each of the factors is greater than threshold 0.7 and the AVE is greater than 0.5 [50], convergence validity is well confirmed.

Table 7. Standardized Regression Coefficient

			Standardized coefficient	C.R.	P-value	AVE	CR
PS5	←-	PS	0.719			0.562	0.865
PS4	←-	PS	0.723	13.902	***		
PS3	←-	PS	0.747	14.341	***		
PS2	←-	PS	0.724	13.917	***		
PS1	←-	PS	0.829	15.763	***		
CR6	←-	CR	0.734			0.596	0.898
CR5	←-	CR	0.732	14.821	***		
CR4	←-	CR	0.77	15.631	***		
CR3	←-	CR	0.761	15.442	***		
CR2	←-	CR	0.772	15.67	***		
CR1	←-	CR	0.856	17.421	***		
PK4	←-	PK	0.728			0.593	0.852
PK3	←-	PK	0.72	14.057	***		
PK2	←-	PK	0.734	14.324	***		
PK1	←-	PK	0.885	16.615	***		
PI3	←-	PI	0.718			0.585	0.808
PI2	←-	PI	0.753	14.101	***		
PI1	←-	PI	0.82	15.086	***		

Table 7. Standardized Regression Coefficient

			Standardized coefficient	C.R.	P-value	AVE	CR
IM1	←-	IM	0.85			0.593	0.879
IM2	←-	IM	0.759	17.659	***		
IM3	←-	IM	0.729	16.717	***		
IM4	←-	IM	0.748	17.327	***		
IM5	←-	IM	0.758	17.628	***		
SI3	←-	PROI	0.757			0.595	0.815
SI2	←-	PROI	0.732	13.745	***		
SI1	←-	PROI	0.822	14.594	***		

Note: PS: platform stability; CR: customer relationship; PK: professional knowledge; IM: immersion; PI: purchase intention; SI: situational involvement; CR: composite reliability; AVE: average variance extracted (AVE); C.R.: critical ratio or t-value (***) $p < 0.001$).

5.2.6 Variance Test for Gender

Table 8 indicates significant differences in the variance test for gender.

Table 8. Independent t-test

	Gender (Mean±Std. Deviation)		t	P-value
	Male (n=230)	Female (n=198)		
Platform stability	3.15±0.93	3.43±0.85	-3.161	0.002**
Customer relations	3.04±0.96	3.34±0.95	-3.190	0.002**
Professional knowledge	3.20±0.97	3.40±0.91	-2.175	0.030*
Immersion	3.12±0.95	3.32±0.99	-2.097	0.037*
Purchase intention	3.19±0.98	3.50±0.87	-3.567	0.000**
Situational Involvement	3.10±1.07	3.37±0.96	-2.764	0.006**

Note: * $p < 0.05$; ** $p < 0.01$

5.2.7 Variance Test for Age

Table 9 confirms significant differences in age categories.

Table 9. ANOVA

	Age (Mean±Std. Deviation)					F	P-value
	18-22 (n=98)	23-28 (n=83)	29-34 (n=83)	35-40 (n=87)	Above 40 (n=77)		
Platform Stability	3.13±0.87	3.07±0.93	3.35±0.91	3.36±0.92	3.54±0.85	3.820	0.005**
Customer Relations	2.86±0.93	3.07±0.94	3.21±0.90	3.37±0.99	3.46±0.97	5.658	0.000**
Professional Knowledge	2.85±1.03	3.20±0.89	3.33±0.91	3.53±0.86	3.67±0.77	10.919	0.000**
Immersion	2.94±0.95	3.09±0.96	3.28±0.93	3.40±0.97	3.42±0.98	4.084	0.003**
Purchase Intention	2.91±0.87	3.19±0.89	3.47±0.86	3.51±0.91	3.67±1.00	9.793	0.000**
Situational involvement	2.97±1.09	3.12±0.97	3.31±1.03	3.29±1.08	3.51±0.86	3.514	0.008**

Note: * p<0.05 ** p<0.01

5.2.8 Analysis of Variance (ANOVA) for Education Level

Table 10 indicates significant differences in education levels except professional knowledge.

Table 10. ANOVA, Education Level

	Education Level (Mean±Std. Deviation)				F	P-value
	Junior or below (n=80)	Senior high school (vocational) (n=107)	College (bachelor's degree) (n=124)	Master's degree or above (n=117)		
Platform Stability	3.15±0.91	3.15±0.86	3.31±0.93	3.46±0.90	2.798	0.040*
Customer Relations	2.95±0.98	2.96±0.97	3.36±0.91	3.35±0.94	6.365	0.000**
Professional knowledge	3.11±0.92	3.26±0.88	3.35±0.99	3.39±0.97	1.616	0.185
Immersion	3.00±0.97	3.05±0.94	3.40±0.93	3.31±1.01	4.240	0.006**
Purchase intention	3.15±0.82	3.16±0.94	3.42±0.96	3.52±0.96	4.167	0.006**
Situational involvement	2.96±1.00	3.04±0.95	3.37±1.02	3.42±1.06	5.372	0.001**

Note: * p<0.05; ** p<0.01

5.2.9 Average Time Spent Browsing Taobao Daily

Table 11 demonstrates significant differences in the average time participants spent browsing Taobao daily.

Table 11. ANOVA, Average Time of Browsing Taobao Daily

	Average Time of Browsing Taobao Daily (Mean±Std. Deviation)						F	P-value
	Less than 1 hour (n=83)	1-3 hours (n=72)	3-5 hours (n=80)	5-7 hours (n=71)	7-9 hours (n=65)	More than 9 hours (n=57)		
Platform Stability	2.91±0.88	3.05±0.94	3.19±0.83	3.42±0.91	3.50±0.86	3.82±0.73	9.869	0.000**
Customer Relations	2.85±0.94	2.91±1.02	3.11±0.94	3.18±0.92	3.56±0.87	3.66±0.81	8.759	0.000**
Professional Knowledge	3.07±0.94	2.88±1.03	3.25±0.92	3.44±0.87	3.58±0.85	3.71±0.78	8.163	0.000**
Immersion	2.96±1.01	2.79±0.90	3.30±0.93	3.25±0.95	3.53±0.96	3.61±0.82	7.819	0.000**
Purchase Intention	2.97±0.89	2.96±0.84	3.31±0.88	3.47±0.91	3.67±0.90	3.81±0.94	10.654	0.000**
Situational involvement	2.96±1.05	3.00±1.04	3.26±1.06	3.18±0.98	3.49±0.88	3.63±0.97	4.697	0.000**

Note: * p<0.05; ** p<0.01

5.2.10 Average Time of Browsing Taobao Live Steaming Daily

Table 12 shows significant differences in the average time participants spent watching Taobao's live streams daily.

Table 12. ANOVA, Average Time of Browsing Taobao Live Streaming Daily

	Average Time of Browsing Taobao Live Streaming Daily (Mean±Std. Deviation)						F	P-value
	Less than 1 hour (n=59)	1-2 hours (n=81)	2-3 hours (n=49)	3-4 hours (n=99)	4-5 hours (n=71)	More than 5 hours (n=69)		
Platform stability	2.89±0.83	3.07±0.92	3.22±0.95	3.27±0.87	3.44±0.90	3.76±0.75	7.909	0.000**
customer relations	2.85±0.95	2.92±0.88	3.09±0.93	3.23±1.00	3.32±1.02	3.61±0.82	6.085	0.000**
Professional knowledge	2.96±0.82	3.21±0.94	3.02±1.01	3.43±0.88	3.36±1.04	3.62±0.85	4.785	0.000**
Immersion	2.83±0.78	2.93±0.98	3.19±1.04	3.31±0.90	3.30±1.03	3.67±0.90	7.018	0.000**
Purchase intention	3.01±0.79	3.19±0.81	3.36±0.98	3.27±1.01	3.39±0.96	3.77±0.91	5.146	0.000**
Situational involvement	2.63±0.96	3.04±0.99	3.31±1.12	3.24±0.99	3.29±0.96	3.82±0.85	10.211	0.000**

Note: * p<0.05; ** p<0.01

5.2.11 Total Years of Shopping Experience on Taobao

Table 13 presents significant differences in the respondents' total years of shopping experience on Taobao.

Table 13. ANOVA, Total Years of Shopping Experience on Taobao

	Total Years of Shopping Experience on Taobao (Mean±Std. Deviation)						F	P-value
	Less than 6 months (n=73)	Six months to 1 year (n=77)	1-2 years (n=70)	2-3 years (n=65)	3-4 years (n=75)	More than 4 years (n=68)		
Platform stability	3.04±0.89	2.94±0.89	3.27±0.93	3.32±0.82	3.45±0.94	3.72±0.75	7.575	0.000**
Customer Relations	2.69±0.84	2.92±0.96	3.16±0.88	3.22±1.03	3.44±0.88	3.70±0.88	11.164	0.000**
Professional Knowledge	2.76±0.84	3.15±0.92	3.30±1.05	3.29±0.93	3.59±0.85	3.71±0.78	10.215	0.000**
Immersion	2.83±0.86	2.80±0.99	3.22±1.02	3.27±0.88	3.66±0.82	3.56±0.92	11.061	0.000**
Purchase Intention	2.88±0.76	3.18±0.86	3.40±0.84	3.25±1.02	3.55±0.94	3.77±0.98	8.477	0.000**
Situational involvement	2.93±0.95	3.00±1.00	3.32±0.87	3.19±1.10	3.46±1.12	3.49±0.99	3.873	0.002**

Note: * $p < 0.05$; ** $p < 0.01$

5.2.12 Correlation Analysis

Pearson Correlation Matrix measures the linear dependence between two variables. As demonstrated in Table 14 below, the relationship between any two variables (platform stability, customer relations, professional knowledge, immersion, purchase intention, and situational involvement) was significant at the 0.01 significance level. The correlation coefficient values were all greater than 0, indicating significant positive correlations between the variables.

Table 14. Pearson Correlation Matrix

	Mean	Std. Deviation	Platform stability	Customer relationship	Professional knowledge	Immersion	Purchase intention	Situational involvement
Platform Stability	3.281	0.908	1					
Customer Relations	3.180	0.966	0.386**	1				
Professional Knowledge	3.295	0.945	0.332**	0.398**	1			
Immersion	3.215	0.972	0.391**	0.497**	0.358**	1		
Purchase Intention	3.333	0.940	0.545**	0.559**	0.524**	0.522**	1	
Situational involvement	3.226	1.026	0.377**	0.413**	0.327**	0.337**	0.381**	1

Note: * $p < 0.05$; ** $p < 0.01$

5.2.13 Structural Equation Model (SEM)

In Figure 3, this study performs SEM with SPSS AMOS 21.0 software which effectively manages the problems of multiple dependent variables and reduces the deviation of estimated values at the same time. We established a structural equation model based on the analysis of the questionnaire. The maximum likelihood method was used to estimate the relevant parameters of the model. The relative index NFI and absolute index RMSEA are widely used. Generally, if the NFI is higher than 0.9 and RMSEA is less than 0.05, the model fits well. The model's fit is acceptable if the figures are between 0.05 and 0.08. [54] asserted that the critical value of the CFI should be 0.9 (the higher, the better), the critical value of Mc should be 0.85 (the higher, the better), and the critical value of RMSEA should be 0.08 (the lower, the better). The model fits better when the value of CMIN/DF is smaller.

5.2.15 Path Coefficients

A path coefficient indicates the direct effect of a variable assumed to be a cause on another variable assumed to be an effect. The relationship between platform stability and immersion ($\beta = 0.208$, $p < 0.05$) was significant, supporting H2a. The relationship between customer relationship and immersion ($\beta = 0.394$, $p < 0.05$) was significant, providing support for H2b. The relationship between professional knowledge and immersion ($\beta = 0.144$, $p < 0.05$) was significant, supporting H2c. The relationship between platform stability and purchase intention ($\beta = 0.331$, $p < 0.05$) was significant, supporting H1a. The relationship between customer relationship and purchase intention was significant, supporting H1b. The relationship between professional knowledge and purchase intention ($\beta = 0.286$, $p < 0.05$) was very significant, strongly supporting H1c. Last, the relationship between immersion and purchase intention ($\beta = 0.213$, $p < 0.05$) was significant, supporting H4. Therefore, the results shown in Table 16 supported H1a, H1b, H1c, H2a, H2b, H2c, and H4.

Table 16. Path Coefficients Analysis

			Standardized Estimate	C.R.	P-value
IM	<---	PS	0.208	3.809	***
IM	<---	CR	0.394	6.753	***
IM	<---	PK	0.144	2.662	0.008
PI	<---	PS	0.331	6.337	***
PI	<---	CR	0.266	4.899	***
PI	<---	PK	0.286	5.683	***
PI	<---	IM	0.213	4.022	***

Note: PS: platform stability; CR: customer relationship; PK: professional knowledge; IM: immersion; PI: purchase intention; SI: situational involvement; C.R.: critical ratio or t-value (***) $p < 0.001$.

5.2.16 Platform Stability and Situational involvement

According to the results of the simple slope analysis presented in Table 17, the interaction term between platform stability and situational involvement was significant ($t = 3.352$, $p = 0.001 < 0.05$), supporting H3a. The details are in Table 17-18 and Figure 4.

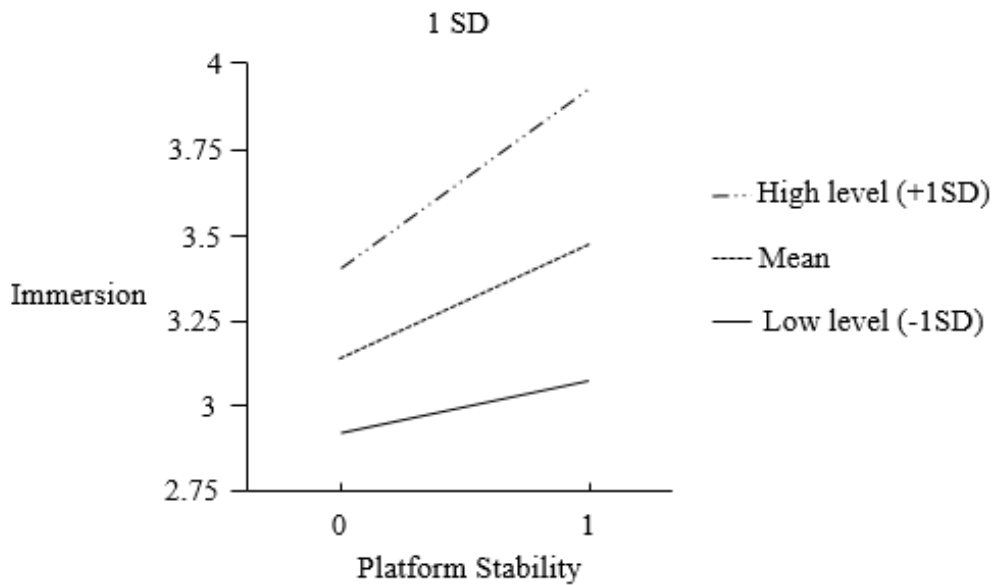
Table 17. Parameter Estimates (n=428)

	Model 1				Model 2				Model 3			
	B	S.E	t	p	B	S.E	t	p	B	S.E	t	p
Constant	3.215	0.043	74.246	0.000**	3.215	0.042	76.051	0.000**	3.160	0.045	70.238	0.000**
Platform Stability	0.419	0.048	8.769	0.000**	0.330	0.050	6.550	0.000**	0.339	0.050	6.811	0.000**
Situational involvement					0.209	0.045	4.687	0.000**	0.222	0.044	5.019	0.000**
Platform Stability *Situational involvement									0.159	0.048	3.352	0.001**
R ²			0.153				0.195				0.215	
Adj. R ²			0.151				0.191				0.210	
F	F (1,426)=76.897,p=0.000				F (2,425)=51.325,p=0.000				F (3,424)=38.786,p=0.000			
ΔR^2			0.153				0.042				0.021	
ΔF	F (1,426)=76.897,p=0.000				F (1,425)=21.968,p=0.000				F (1,424)=11.236,p=0.001			

Note: Dependent Variable: immersion (* $p < 0.05$; ** $p < 0.01$)

Table 18. Simple Slope Analysis on Platform Stability and Immersion

Level	Coef.	S.E.	t	p	95% CI	
Mean	0.339	0.050	6.811	0.000	0.242	0.437
High Level (+1 SD)	0.503	0.072	7.012	0.000	0.362	0.644
Low Level (-1 SD)	0.176	0.068	2.599	0.010	0.043	0.309

**Figure 4.** Simple Slope of Platform Stability and Immersion

5.2.17 Customer Relationship

As shown in Table 19, the interaction term between the customer relationship and situational involvement was significant ($t = 3.576$, $p = 0.000 < 0.05$), supporting H3b. This effect is presented in the simple slope analysis in Table 19-20 and Figure 5.

Table 19. Parameter Estimates

	Model 1				Model 2				Model 3			
	B	S.E	t	p	B	S.E	t	p	B	S.E	t	p
Constant	3.215	0.041	78.766	0.000**	3.215	0.040	79.779	0.000**	3.151	0.044	72.093	0.000**
Customer relations	0.501	0.042	11.832	0.000**	0.435	0.046	9.481	0.000**	0.419	0.045	9.216	0.000**
Situational involvement					0.150	0.043	3.468	0.001**	0.181	0.044	4.170	0.000**
Customer relations *Situational involvement									0.159	0.044	3.576	0.000**
R ²		0.247				0.268				0.289		
Adj. R ²		0.246				0.265				0.284		
F	F (1,426)=139.995,p=0.000				F (2,425)=77.825,p=0.000				F (3,424)=57.584,p=0.000			
ΔR ²		0.247				0.021				0.021		
ΔF	F (1,426)=139.995,p=0.000				F (1,425)=12.030,p=0.001				F (1,424)=12.787,p=0.000			

Note: Dependent Variable: Immersion (* $p < 0.05$ ** $p < 0.01$)

Table 20. Simple Slope Analysis on Customer Relationship and Immersion

Level	Coef.	S.E.	t	P-value	95% CI
Mean	0.419	0.045	9.216	0.000	0.330 0.508
High Level (+1SD)	0.582	0.061	9.518	0.000	0.462 0.702
Low Level (-1SD)	0.256	0.067	3.795	0.000	0.124 0.388



Figure 5. Simple Slope of Customer Relationship and Immersion

5.2.18 Professional Knowledge

Table 21 demonstrates that professional knowledge had a significant ($t = 7.905, p = 0.000 < 0.05$) positive impact on immersion, supporting H3a. The interaction term between professional knowledge and situational involvement was significant ($t = 5.809, p = 0.000 < 0.05$), which means that professional knowledge had a significant positive impact on immersion, and that the influence range of situational involvement differed significantly based on the level (see also Table 21-22 and Figure 6).

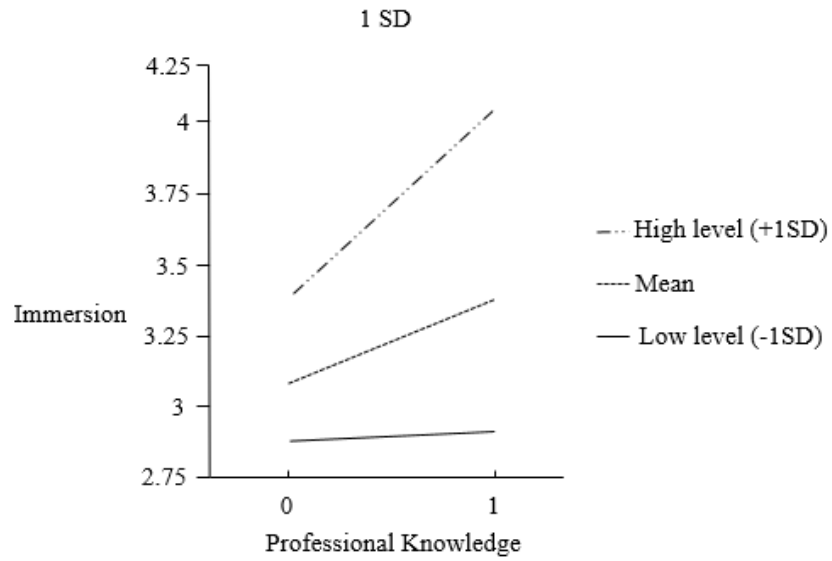
Table 21. Parameter Estimates (n=428)

	Model 1				Model 2				Model 3			
	B	S.E	t	p	B	S.E	t	p	B	S.E	t	p
Constant	3.215	0.044	73.174	0.000**	3.215	0.043	75.461	0.000**	3.135	0.043	72.396	0.000**
Professional knowledge	0.368	0.047	7.905	0.000**	0.285	0.048	5.972	0.000**	0.290	0.046	6.296	0.000**
Situational involvement					0.233	0.044	5.296	0.000**	0.263	0.043	6.151	0.000**
Professional knowledge *Situational involvement									0.253	0.044	5.809	0.000**
R ²			0.128				0.182				0.242	
Adj. R ²			0.126				0.178				0.237	
F			F (1,426)=62.482,p=0.000				F (2,425)=47.248,p=0.000				F (3,424)=45.172,p=0.000	
ΔR ²			0.128				0.054				0.060	
ΔF			F (1,426)=62.482,p=0.000				F (1,425)=28.047,p=0.000				F (1,424)=33.742,p=0.000	

Note: Dependent Variable: Immersion (* $p < 0.05$ ** $p < 0.01$)

Table 22. Simple Slope Analysis on Professional Knowledge and Immersion

Level	Coef.	S.E.	t	p	95% CI	
Mean	0.290	0.046	6.296	0.000	0.200	0.380
High Level (+1SD)	0.550	0.065	8.491	0.000	0.423	0.677
Low Level (-1SD)	0.030	0.064	0.474	0.636	-0.095	0.155

**Figure 6.** Simple Slope of Professional Knowledge and Immersion

5.2.19 Overall Results of the Hypotheses Tests

Based on the above statistical analysis, Table 23 summarizes the results of the hypotheses tests.

Table 23. Results of the Hypotheses Tests

Hypotheses	Support? (Yes/No)
H1a: In live stream shopping, platform stability has a positive impact on customer purchase intention.	Yes
H1b: In live stream shopping, the quality of the customer relationship is positively related to customer purchase intention.	Yes
H1c: In live stream shopping, the streamer's professional knowledge is positively related to customer purchase intention.	Yes
H2a. Platform stability increases customers' immersion in the live stream shopping environment, which enhancing their purchase intention.	Yes
H2b. A better customer relationship increases customers' immersion in the live stream shopping environment, which enhancing their purchase intention.	Yes
H2c. A streamer's professional knowledge promotes customers' immersion in the live stream shopping environment, which enhancing their purchase intention.	Yes
H3a: In live stream shopping, the greater the situational involvement, the more positively platform stability affects customer immersion and customer purchase intention	Yes
H3b: In live stream shopping, the greater the situational involvement, the more positively the customer relationship affects customer immersion and customer purchase intention.	Yes
H3c: In live stream shopping, the greater the situational involvement, the more positively the streamer's professional knowledge affects customer immersion and customer purchase intention.	Yes
H4: Immersion is positively associated with customer purchase intention.	Yes

6. DISCUSSION AND IMPLICATIONS

To help improve live streaming services after the pandemic, this study developed a novel framework for exploring the essential factors that help promote live stream shopping from the perspectives of IT affordances. We included the moderating effect of situational involvement and the mediating effect of immersion, both of which contributed to customer purchase intention in the live stream shopping context. The results of our hypothesis tests suggest that the quality of live streaming has a direct and significant positive effect on customers' purchase intention. Specifically, the relationship between platform stability, the customer relationship, and streamers' professional knowledge, respectively, and purchase intention are significantly positive.

6.1 Theoretical Implications

First, our results reveal the significant positive impact of customer immersion on customer purchase intention; customers are more involved in live stream shopping activities when they immerse themselves in these activities, which encourages them to keep watching. As such, immersion increases the likelihood of customers enjoying the experience of live stream shopping [27], and enhancing their purchase intention [10].

Second, our results indicate that situational involvement is a mechanism by which affordances influence purchase intention. Whether customers have a high or a low degree of involvement, their purchase intention are affected by the availability of both product details and the streamer's advice and guidance. Customers with higher involvement feel more engaged and more immersed when watching live streams or participating in shopping activities.

Third, the results of our data analysis reveal a significant positive relationship between live streaming quality and customers' immersion. The findings suggest that platform stability, the customer relationship, and streamer's professional knowledge are all positively related to customer immersion. This paper confirms the impact of live streaming quality on immersion as shown in previous studies. For instance, Dong & Wang [12] claimed that visibility affordance (platform stability in this work) and metavoicing affordance (here the customer relationship) significantly enhanced the interaction between customers and sellers. Visibility affordance makes product information available to customers in real-time, while metavoicing affordance enables effective communication between customers and the streamer.

Lastly, the results show that customer immersion plays a mediating role in the relationship between platform stability, the customer relationship, and the streamer's professional knowledge, respectively, of purchase intention. This finding differs from those of previous studies, which emphasized the relationship between visibility affordance, metavoicing affordance, guidance affordance, and customer purchase intention [10] [26]. Our three refined affordances elements, namely, platform stability, the customer relationship, and the professional knowledge, are essential quality factors that provide customers with specific information. These elements give clear guidance to customers for their product purchases and support the construction of relationships with customers, resulting in more enjoyable shopping experiences. The results provide a new perspective for future research in the context of electronic commerce studies.

6.2 Managerial Implications

First, platform stability is an essential factor influencing customers' choice of platform and the time they spend watching live streams. Given that most of our respondents claimed to spend less than one hour using Taobao Live every day ($n = 83$, 19.39%), it is crucial that platforms must improve their efficiency and effectiveness to maintain customers' interest and attention continuously beyond one hour.

Second, a stable platform allows customers to immerse themselves in the content and activities, collect more detailed and real-time information than the traditional graphic method, and thus effectively reduce customers' perceptions of the risk associated with product purchases. The finding emphasizes the importance of platform stability, which allows for real-time communication and in-depth interaction between customers and sellers, enabling sellers to provide effective live streaming services. Zhang, et al. [55] asserted that the stability of a platform's live streaming service is also vital for sellers that need to avoid platforms with limited technical support and unfair traffic distribution strategies. Advanced technical support can help improve the traffic and reputation of a platform, thereby attracting more streamers and sellers.

Third, establishing and strengthening relationships with customers enables more effective communication and interaction between customers and streamers and help customers obtain product information. It helps not only to increase sales with minimum cost but also promotes the likelihood of customers making more purchases. Sellers and platforms should work together to provide customers with sufficient commodity information and good purchase services to strengthen real-time communication and relationships with customers.

Fourth, most of our respondents browsed Taobao Live for 3 to 4 hours daily. The result suggests that live streams with a duration of 3 to 4 hours are best to retain customers, and that any longer is inefficient. In the case of Taobao, streamer–customer intimacy provides customers with a standard by which to measure the credibility of a live streaming platform. Famous live rooms with a good reputation typically attract more customers with higher intimacy levels. Through cumulative experience and judgment, these customers gradually develop the belief that in a given live streaming platform, products are good quality, information is reliable, and transactions are safe.

Fifth, the professional knowledge of streamers can enable them to provide more professional and personalized purchasing services, thereby reducing customers' perceived risk. Giving professional explanation of a product and its functions in a live stream helps customers to understand the details and parameters of the product. As shown in Table 3, over 56% of the respondents in our study had received junior college education or had a bachelor's degree or higher. Professionalism is an essential criterion by which customers judge whether a product in a live room is credible. If the streamer cannot smoothly and professionally answer questions related to the product, the perceived risk which associated with purchasing products in that room will increase. Consequently, sellers should improve their professionalism to provide customers with personalized suggestions regarding products and the best service possible, preferably exceeding customers' expectations to reduce any risk perception. Professional advice can be an excellent motivator for hesitant customers to persuade them to make a purchase. In this way, professionalism increases the perceived reliability and effectiveness of live stream shopping broadcasts.

Sixth, most respondents had only 6 to 12 months' experience using Taobao before completing the questionnaire, which suggests that Taobao still has good potential to grow and attract more customers. Online streaming platforms such as Taobao should ensure that the image quality of their live broadcasts is consistently high.

Finally, our results reveal that the more time customers spend using the Taobao platform, the higher the expectations they have of live streaming quality in general. To provide quality service, maintaining instantaneous communication between the streamer and customers should be secured. Such communication improves the relationship between the customer and the streamer, partly because it enables streamers to respond to customers' messages promptly. Attentive professional responses are essential to improve relationships and reduce perceived risk.

7. CONCLUSION

Live streaming is one of the most affordable, efficient, and effective online marketing tools, which has gained much success in the pandemic era. In order to cope with the continued economic downturn, the use of online video platforms is expected to continue to surge. Facing the post-pandemic era, businesses increasingly turn to live streaming to resume operations and become more adaptable and resilient in the face of potential future hardships. To help inexperienced merchants improve customers' online shopping experience, this study identified the significant factors that promote immersion in live stream shopping, using Taobao Live as an example. We established a framework emphasizing three major aspects: platform stability, the customer relationship, and professional knowledge, corresponding to the affordance categories of visibility, metavoicing, and guidance, respectively. We included the moderating effect of situational involvement, and the mediating effect of immersion, which contribute to customer purchase intention in a live stream shopping environment. By understanding these essential elements contributing to customers' purchase intention, we provide practical suggestions and strategic insights for live streaming sellers, customers, and platform developers, helping them promote sales via streaming media.

8. LIMITATIONS AND FUTURE RESEARCH

The limitations of this study provide directions for future studies. Because we focused on customers' purchase intention rather than their actual purchase behavior, further research should consider using customers' real purchase data to understand their purchase behavior in live stream shopping contexts. Longitudinal and experimental research methods can help explore customers' actual live stream shopping purchases to obtain substantial results for study. Future research can explore the differences between live stream shopping platforms, with a focus on live streaming quality, and determine how these differences impact customers' purchase behavior from multiple perspectives,

such as the impact of the unique characteristics of the individual platforms on customer immersion and specific product-related factors that may influence purchase intention.

9. REFERENCES

- [1] Sina Finance, "Live report of Taobao in 2021," 2021.
- [2] G. Parchoma, "The contested ontology of affordances: Implications for researching technological affordances for collaborative knowledge production," *Computers in human behavior*, vol. 37, pp. 360-368, 2014.
- [3] J. J. Gibson, *The ecological approach to visual perception*, New York ; London: Psychology Press, 2015.
- [4] D. A. Norman, *The psychology of everyday things*, New York: Basic Books, 1988.
- [5] Z. Deng, P. Benckendorff and J. Wang, "Travel live streaming: an affordance perspective," *Information technology & tourism*, vol. 23, no. 2, pp. 189-207, 2021.
- [6] M. Bower and D. Sturman, "What are the educational affordances of wearable technologies?," *Computers and education*, vol. 88, pp. 343-353, 2015.
- [7] P. M. Leonardi, M. Huysman and C. Steinfield, "Enterprise Social Media: Definition, History, and Prospects for the Study of Social Technologies in Organizations," *Journal of computer-mediated communication*, vol. 19, no. 1, pp. 1-19, 2013.
- [8] G. Piccoli, "Triggered essential reviewing: the effect of technology affordances on service experience evaluations," *European journal of information systems*, vol. 25, no. 6, pp. 477-492, 2016.
- [9] Y. A. Argyris and K. Monu, "Corporate Use of Social Media: Technology Affordance and External Stakeholder Relations," *Journal of organizational computing and electronic commerce*, vol. 25, no. 2, pp. 140-168, 2015.
- [10] Y. Sun, X. Shao, X. Li, Y. Guo and K. Nie, "How live streaming influences purchase intentions in social commerce: An IT affordance perspective," *Electronic commerce research and applications*, vol. 37, p. 100886, 2019.
- [11] J. Lin, Z. Luo, X. Cheng and L. Li, "Understanding the interplay of social commerce affordances and swift guanxi: An empirical study," *Information & management*, vol. 56, no. 2, pp. 213-224, 2019.
- [12] X. Dong and T. Wang, "Social tie formation in Chinese online social commerce: The role of IT affordances," *International journal of information management*, vol. 42, pp. 49-64, 2018.
- [13] J. W. Treem and P. M. Leonardi, "Social Media Use in Organizations: Exploring the Affordances of Visibility, Editability, Persistence, and Association," *Annals of the International Communication Association*, vol. 36, no. 1, pp. 143-189, 2013.

- [14] P. M. Leonardi, "When Flexible Routines Meet Flexible Technologies: Affordance, Constraint, and the Imbrication of Human and Material Agencies," *MIS quarterly*, vol. 35, no. 1, pp. 147-167, 2011.
- [15] K. Koroleva and G. C. Kane, "Relational affordances of information processing on Facebook," *Information & management*, vol. 54, no. 5, pp. 560-572, 2017.
- [16] X. Dong, T. Wang and B. Izak, "IT affordances in online social commerce: Conceptualization validation and scale developmen," in *Twenty-second Americas Conference on Information Systems*, San Diego, 2016.
- [17] B. Lu, W. Fan and M. Zhou, "Social presence, trust, and social commerce purchase intention: An empirical research," *Computers in human behavior*, vol. 56, pp. 225-237, 2016.
- [18] A. Wongkitrungrueng and N. Assarut, "The role of live streaming in building consumer trust and engagement with social commerce sellers," *Journal of business research*, vol. 117, pp. 543-556, 2020.
- [19] W. Hamilton, O. Garretson and A. Kerne, "Streaming on twitch," in *SIGCHI Conference on human factors in computing systems*, 2014.
- [20] M. Hu, M. Zhang and Y. Wang, "Why do audiences choose to keep watching on live video streaming platforms? An explanation of dual identification framework," *Computers in human behavior*, vol. 75, pp. 594-606, 2017.
- [21] N. Liu, "Acquisition of loyal customers from the perspective of integrated marketing," *Marketing Management Review*, vol. 11, pp. 70-71, 2020.
- [22] J. Kim, A. M. Fiore and H.-H. Lee, "Influences of online store perception, shopping enjoyment, and shopping involvement on consumer patronage behavior towards an online retailer," *Journal of retailing and consumer services*, vol. 14, no. 2, pp. 95-107, 2007.
- [23] S. B. MacKenzie, P. M. Podsakoff and N. P. Podsakoff, "Construct Measurement and Validation Procedures in MIS and Behavioral Research: Integrating New and Existing Techniques," *MIS quarterly*, vol. 35, no. 2, pp. 293-334, 2011.
- [24] J. L. H. Bowden, "The Process of Customer Engagement: A Conceptual Framework," *Journal of marketing theory and practice*, vol. 17, no. 1, pp. 63-74, 2009.
- [25] L. Caroux, K. Isbister, L. Le Bigot and N. Vibert, "Player–video game interaction: A systematic review of current concepts," *Computers in human behavior*, vol. 48, pp. 366-381, 2015.
- [26] X. Shao, "Research on the mechanism of the influence of Taobao live shopping platform availability on customers' purchase intention," Zhejiang University of technology and Technology, Zhejiang, 2020.
- [27] M. Y. C. Yim, S. C. Chu and P. L. Sauer, "Is Augmented Reality Technology an Effective Tool for E-commerce? An Interactivity and Vividness Perspective," *Journal of interactive marketing*, vol. 39, pp. 89-103, 2017.

- [28] Q. Su, F. Zhou and Y. J. Wu, "Using Virtual Gifts on Live Streaming Platforms as a Sustainable Strategy to Stimulate Consumers' Green Purchase Intention," *Sustainability (Basel, Switzerland)*, vol. 12, no. 9, p. 3783, 2020.
- [29] S. Krishnan and R. Sitaraman, "Video stream quality impacts viewer behavior," *IEEE/ACM Transactions on Networking (TON)*, vol. 21, no. 6, pp. 2001-2014, 2013.
- [30] L. Wang, "Design and implementation of P2P-based radio and television new media website," Harbin Engineering University, Harbin, 2011.
- [31] F. Meng, "Research on the influence of opinion leaders on purchase intention in social business environment," Nanjing University, Nanjing, 2012.
- [32] X. Z. R., "The influence of network opinion leaders on the Internet in the media era," *New Media Research*, no. 10, pp. 21-23, 2015.
- [33] J. Yang, R. Sarathy and J. Lee, "The effect of product review balance and volume on online Shoppers' risk perception and purchase intention," *Decision Support Systems*, vol. 89, pp. 66-76, 2016.
- [34] X. Xu, J. H. Wu and Q. Li, "What drives consumer shopping behavior in live streaming commerce?," *Journal of electronic commerce research*, vol. 21, no. 3, pp. 144-167, 2020.
- [35] E. Ko, E. Y. Kim and E. K. Lee, "Modeling consumer adoption of mobile shopping for fashion products in Korea," *Psychology & marketing*, vol. 26, no. 7, pp. 669-687, 2009.
- [36] Y. Liu, Q. Li and M. Yin, "The stimulating effect of the atmosphere of online shopping festival on consumers' impulsive shopping behavior," *Business Research*, no. 7, pp. 18-23, 2018.
- [37] H. J. Park and L. M. Lin, "The effects of match-ups on the consumer attitudes toward internet celebrities and their live streaming contents in the context of product endorsement," *Journal of retailing and consumer services*, vol. 52, p. 101934, 2020.
- [38] X. Y. Han and Z. L. Xu, "The influence of e-commerce anchor attributes on consumers' online purchase intention-based on grounded Theory," *Journal of Foreign Economics & Management*, vol. 10, no. 42, pp. 7-14, 2020.
- [39] C. Ma, "Research on communication strategy of China's webcast platform," Shandong University, Shandong, 2017.
- [40] J. M. Sun, "The interactive behavior and psychology of Taobao live broadcasting room under the fan economy," *Radio & TV Journal*, no. 11, pp. 148-149, 2020.
- [41] Y. H. Gao, "Research on the influence of e-commerce anchor characteristics on consumers' purchase intention," Harbin Institute of Technology, Harbin, 2020.
- [42] Z. R. Xu, "The influence of network opinion leaders on the Internet in the media era," *New Media Research*, no. 10, pp. 21-23, 2015.

- [43] I. B. Hong, "Understanding the consumer's online merchant selection process: The roles of product involvement, perceived risk, and trust expectation," *International journal of information management*, vol. 35, no. 3, pp. 322-336, 2015.
- [44] P. A. Pavlou, H. Liang and Y. Xue, "Understanding and Mitigating Uncertainty in Online Exchange Relationships: A Principal-Agent Perspective," *MIS quarterly*, vol. 31, no. 1, pp. 105-136, 2007.
- [45] Y. Li, "Research on consumer perceived risk of online shopping with different product involvement," Southwest University of Science and Technology, 2007.
- [46] A. U. Zafar, J. Qiu, Y. Li, J. Wang and M. Shahzad, "The impact of social media celebrities' posts and contextual interactions on impulse buying in social commerce," *Computers in human behavior*, vol. 115, p. 106178, 2021.
- [47] A. Y. L. Chong, E. Lacka, B. Li and H. K. Chan, "The role of social media in enhancing guanxi and perceived effectiveness of E-commerce institutional mechanisms in online marketplace," *Information & management*, vol. 55, no. 5, pp. 621-632, 2018.
- [48] C. C. Chen and Y. C. Lin, "Corrigendum to "What drives live-stream usage intention? The perspectives of flow, entertainment, social interaction, and endorsement", *Telematics and informatics*, vol. 35, no. 6, p. 1794, 2018.
- [49] H. J. Chang, M. Eckman and R. N. Yan, "Application of the Stimulus-Organism-Response model to the retail environment: the role of hedonic motivation in impulse buying behavior," *The International review of retail, distribution and consumer research*, vol. 21, no. 3, pp. 233-249, 2011.
- [50] C. Fornell and D. F. Larcker, "Evaluating structural equation models with unobservable variables and measurement error," *Journal of marketing research*, vol. 18, no. 1, p. 39, 1981.
- [51] J. W. C. A. B. Osborne and J. T. Kellow, "Best Practices in Exploratory Factor Analysis," in *Best Practices in Quantitative Methods*, Thousand Oaks, SAGE Publications, Inc, 2008, pp. 205-213.
- [52] T. A. Brown, *Confirmatory factor analysis for applied research*, New York ; London: The Guilford Press, 2015.
- [53] J. F. Hair, Jr. and W. C. Black, "Reading and understanding more multivariate statistics," in *Cluster analysis*, American Psychological Association, Washington DC, 2000, pp. 147-205.
- [54] Z. Wen, J. Hou and H. Mash, "Testing structural equation models: fitting exponent and chi-square criterion," *Acta Psychologica Sinica*, vol. 2, pp. 186-194, 2004.
- [55] M. Zhang, F. Qin, G. A. Wang and C. Luo, "The impact of live video streaming on online purchase intention," *The Service industries journal*, no. 10, pp. 656-681, 2020.