

The Measurement on Service Quality of E-commerce Live Streaming: Modeling and Its Validity

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Abstract. This study investigates the conceptual model and measurement scale of the service quality of E-commerce Live Streaming (ELS). Findings indicate that the service quality of ELS comprises interaction quality (entertainment and professionalism), environmental quality (activeness and convenience), and outcome quality (promotion and dependability). The relative predictability of these dimensions on the service quality of ELS also falls into a particular order: Interaction quality is most predictable, followed by outcome quality, then environmental quality. Finally, each of the dimensions has positive effects on consumers' purchase intention by effecting their cognitive trust and emotional trust. And interaction quality is most predictable for effecting consumers' cognitive trust. Environmental quality is most predictable for effecting consumers' emotional trust. These results altogether provide valuable insights into the service quality management of ELS.

Keywords: E-commerce Live Streaming; Service Quality; Structural Equation Model; Validity Test.

1. Introduction

Recently, E-commerce Live Streaming (ELS) has gained increasing attention, fundamentally involving the interpretation of products to consumers through live broadcasting to facilitate the purchasing process [1]. Many ELS have achieved significant performance due to their high service quality. For instance, Oriental Selection live broadcasts are popular with consumers due to Dong Yuhui's humorous and professional bilingual broadcasts; Similarly, Luo Yonghao's active interaction during the live broadcast drew in nearly 500 million viewers and achieving sales that exceeded 11 billion yuan in just 3 hours. These ELS occupy consumers' minds, resulting in substantial performance. However, Li Jiaqi was in the middle of a controversy over the "\$79 Huaxizi" incident. Li Xiang, the host, spent 800,000 yuan on a time slot to sell mink coats in a live broadcast but failed to generate any revenue due to a high-cold explanation attitude. Numerous cases of failed product promotion due to service quality in ELS are varied. Therefore, understanding and measuring consumers' perceived service quality in ELS is crucial for enhancing consumer purchase intentions, improving live broadcast performance, and promoting the development of the ELS.

Existing research has mainly explored the content generation of ELS from the perspective of ontology construction, such as anchor characteristics, live content, etc. [2][3][4], and the information dissemination of ELS, such as the current development status and marketing strategies [5][6]. There is a lack of exploration from the perspective of consumer perception in understanding consumers' perception of ELS, especially a systematic measurement of service quality based on consumer perception. Service quality fundamentally arises from the comparison between consumer perception and expected service [7]. Currently, there is considerable research on the conceptualization and measurement of service quality [8][9][10], but there is a scarce exploration of the theoretical model and measurement methods for the service quality of ELS. The measurement tools for the service quality of ELS urgently need development.

This study investigates how to suitably understand and measure the service quality of ELS. Specifically, this study attempts to address three questions: (1) How to define the conceptual connotation of the service quality of ELS? (2) How to develop the measurement dimensions for the service quality of ELS based on in-depth interviews? (3) How to develop and validate the

measurement scale for the service quality of ELS? To answer these research questions, this study reviews relevant literature to further delineate the conceptualization of the service quality of ELS. Through in-depth interviews, dimension development is conducted based on grounded theory, and exploratory factor analysis and confirmatory factor analysis are employed to refine the constituent elements and assess the validity and predictive validity of the model. This study finds a quality evaluation scale for ELS by evaluating the entire service process and validates the process by which the service quality of ELS affects consumer trust, thereby influencing consumer purchase intentions.

2. Theoretical Background

2.1. The Service Quality of ELS

Increasing at unprecedented levels, the e-commerce livestreaming (ELS) provides users with a novel purchasing experience in online shopping and has become a crucial means for consumer upgrades, brand promotion, traffic aggregation, and customer relationship management [11]. The operational process involves multiple entities, including merchants, anchor, online platforms, and consumers. And ELS is a marketing strategy with high real-time and interactive features, aiming to capture consumer attention, fundamentally involving the sale of products through live broadcasts [12][13][14].

The format of ELS essentially falls within the service industry, and the essence of ELS is considered a service provided by live streaming operators. Different consumers hold varying perceptions of the services they receive, thus prompting research into service quality. There are two main perspectives in existing definitions of the conceptual connotations of service quality. One perspective views service quality as the gap between the service consumers receive and the service they expect [8][15]. For instance, Zeithaml suggests that service quality represents the difference between consumers' expected and perceived services, with lower quality indicated when expectations exceed perceptions, and higher quality indicated when expectations fall below perceptions. Service quality reflects the level and consistency of services provided by a business. Another perspective considers service quality as a comprehensive evaluation of the entire purchasing process [9][16][17]. For example, Dabholkar believes that service quality encompasses all features and characteristics of services that satisfy consumer needs. Based on existing research, the service quality of ELS can be understood as the gap between consumers' expected complete live streaming purchasing experience and the actual service experience they receive in the context of ELS.

2.2. The Measurement Scale of the Services Quality of ELS

Existing research on service quality has primarily focused on evaluation models and measurements of service quality, as well as the study of electronic service quality. The dimensions and indicators of evaluation mainly involve three aspects. Firstly, from the perspective of the interaction process, service quality is measured through the relationship between practitioners and customers during the service delivery process. For example, measurement indicators of service quality in the service interaction process include functional quality and corporate image [8], reliability and assurance [9], practitioners' attitudes, actions, and professionalism [18], customization and flexibility, empathy, and trust [19], among others. Secondly, from the perspective of the live environment, service quality is measured through consumer-perceived physical environments, among other factors. For instance, Brady suggests that the quality of the physical environment can be measured through place atmosphere, spatial layout, and social elements [18]. Thirdly, from the perspective of the live outcome, service quality is measured through tangible outcomes and customer satisfaction after the service delivery process. For example, LaLonde suggests that after-sales service quality can be assessed through responsiveness, compensatory measures, and completion [20]. Other measurement factors include technical quality [8], resource utility [21], among others.

3. Methodology

This study, based on Grounded Theory, defines the dimensions and items for evaluating the service quality of ELS through in-depth interviews. Exploratory factor analysis is employed for scale purification, and confirmatory factor analysis is used to validate the scale's reliability and examine model fit. Predictive validity testing is conducted to confirm the predictive utility and appropriateness of the scale.

3.1. Item Generation

To evaluate the service quality of ELS, this study initially employed in-depth interviews and group discussions. Eight individuals who participated in ELS were interviewed to gather their experiences and insights. This preliminary data collection formed the basis for theoretical sampling. Subsequently, a random sampling method was used to identify participants engaged in ELS purchases, and 20 consumers with substantial experience in this domain were selected. The criterion for substantial experience was defined as a purchasing age of at least 2 years, with a frequency of no less than twice a month. The selected 20 participants were randomly divided into five groups of four individuals each. Four groups focused on exploring factors influencing consumer purchasing behavior related to the service quality of ELS, while the fifth group was involved in theoretical saturation testing. Each group was interviewed for 20-30 minutes, and demographic characteristics of the participants are presented in Table 1.

Table 1. Demographic Characteristics of the Questionnaires

Classification		Frequency (n=20)	%	Classification		Frequency (n=20)	%
Gender	Male	8	40	Education	Elementary/Middle School Education	2	10
	Female	12	60		College graduate	3	15
Age	18-22	14	70		University graduate	14	70
	22-26	3	15		Postgraduate	1	5
	26-30	2	10	Average monthly (Disposable) Income	Below 1500	8	40
	Above 30	1	5		1500-3500	7	35
Occupation	Student	15	75		3500-5500	1	5
	Enterprise staff	3	15		5500-7500	3	15
	Self-employed	2	10	Above 7500	1	5	

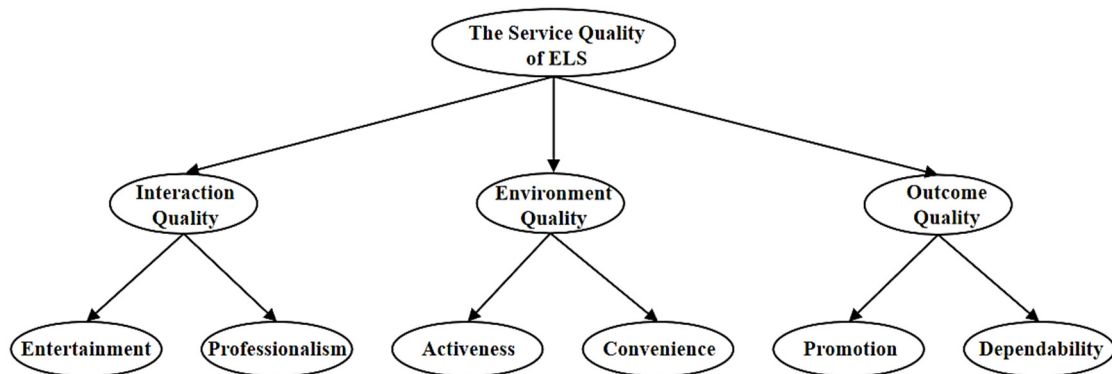


Figure 1. Conceptual Model of the Service Quality of ELS

This study utilized Grounded Theory to organize and analyze interview data through iterative coding. The coding process involved three steps. Firstly, the process of initial coding identified first-order categories of codes, resulting in 18 concepts and 6 initial categories, as shown in Table 2. Then,

second-coded categories were categorized, resulting in 3 main categories, as shown in Table 3. Finally, selective coding involved in-depth exploration of interview data and the application of data from the fifth group to conduct theoretical saturation testing of the extracted categories. The final conceptualization of the service quality of ELS comprised the hierarchical structure of interaction quality, environment quality, and outcome quality, as illustrated in Figure 1.

Table 2. First-Order Concepts

Original Statements	Conceptualization	Categorization
<p>"The hostess is exceptionally attractive and eye-catching. During the explanation of product information, she interjects with humorous internet memes. She even personally tried on a dress and danced in the live broadcast, making it especially entertaining."; "The live broadcast recommended some interesting items, such as sunset lamps and quirky-shaped dorm storage boxes."; "She creatively showcased the dresses along with hats, high heels, and handbags, incorporating other elements to create a vacation-themed livestream room."; "The host blended different food ingredients together, creating a 'Unique Taste Series' that most people wouldn't dare to try."</p>	<p>Anchor 's Charm, Interaction Style, Product Settings</p>	<p>Entertainment</p>
<p>"The host not only comprehensively introduced the product information but also shared practical tips, which made me trust her quite a bit."; "The pace of the live broadcast was steady; originally, I didn't plan to buy clothes, but after the host tried them on and introduced them, I placed an order."; "Even though real-name authentication is required when placing an order, there are privacy regulations, and customer service will send the order for me to confirm again, very thoughtful."</p>	<p>Commentary Skills, Purchase Process, Customer Service Attitude</p>	<p>Professionalism</p>
<p>"The background of the live broadcast room is decorated with various emoji-themed balloon elements, which is especially interesting."; "Last time, I bought a lipstick in a Taobao live broadcast room. The lighting in the live broadcast room was well-coordinated, giving me a particularly bright feeling. The color of the lipstick attracted me."; "The live broadcast room plays the latest popular music, which is very appealing to me."; "In the comment section of the live broadcast room, many buyers communicate and ask each other questions."; "The host pays great attention to the audience and has been interacting continuously.";</p> <p>"Many viewers send flowers and likes to the host, creating a lively atmosphere."; "Many people place orders in the live broadcast room."; "After the host throws out the purchase link, many people immediately place orders, and it sells out in about five minutes."</p>	<p>Scene Arrangement, High Interactivity, Purchase Enthusiasm</p>	<p>Activeness</p>
<p>"The shopping links and interface settings in the live broadcast room are reasonable, making it very convenient to select products."; "When buying clothes, the host with a similar body type tried them on live, allowing me to directly see how the clothes would look on me."; "After placing the order, the delivery was very fast, and I received the items in about two days."; "Ordering in the live broadcast room allows for easy returns if the product is not satisfactory. The interface is user-friendly, and return shipping is free, with automatic door-to-door pick-up."</p>	<p>Product Selection, Product Acquisition, Product Returns and Exchanges</p>	<p>Convenience</p>
<p>"The prices of products in the live broadcast room are lower than those in the store."; "The products in the live broadcast room have a higher cost-performance ratio."; "Completing tasks such as sharing the live broadcast room or following the host in the live broadcast room qualifies you for a lucky draw."; "After placing an order, there are small complimentary gifts."</p>	<p>Cost-Effective Purchase, Discount Magnitude, Purchase Rewards</p>	<p>Promotion</p>
<p>"Purchase transactions can be conducted anonymously."; "I am very concerned about the potential leakage of my phone number and payment password."; "I bought a coat in the live broadcast room last month to go to a concert, and it broke after a few days."; "Previously, when buying things in the live broadcast room, the displayed products were abundant, but upon receiving them, I found they were much fewer than shown in the live broadcast room."; "I ordered two boxes of lemon slices, but only received one box."</p>	<p>Privacy Assurance, Product Quality, Authentic Information</p>	<p>Dependability</p>

Table 3. Second-Order Themes

Aggregate Dimensions	Categorization	Relational Connection of Categories
Interaction Quality	Entertainment; Professionalism	The interactive the service quality of ELS is manifested through providing entertaining services in terms of the anchor 's charm, interactive methods, and product settings, as well as delivering professional services in commentary skills, purchase processes, and customer service attitudes.
Environment Quality	Activeness; Convenience	The environmental quality of ELS is reflected by creating an engaging environment through scene arrangement, interactive frequency, and purchasing aspects, as well as facilitating a convenient service environment in terms of product selection, acquisition, and returns.
Outcome Quality	Promotion; Dependability	The result the service quality of ELS is reflected through affordability in terms of pricing and emphasizes reliability features in aspects such as privacy assurance, product quality, and information.

3.2. Scale Purification

Table 4. Initial Scale of the Service Quality of ELS

Second-Order Themes	First-Order Concepts	Label	Scale Items	Reference
Interaction Quality	Entertainment	INEN1	The anchor 's appearance, voice, personality, or style is very appealing to me.	(Zhang,2020; Xie C,2022)
		INEN2	I find it especially enjoyable to participate in interactions within the e-commerce live broadcast.	
		INEN3	The e-commerce anchor makes me feel curious and entertained when showcasing products.	
	Professionalism	INPR1	The anchor emphasizes providing detailed introductions of the products when recommending them.	
		INPR2	The customer service's attitude makes me feel very comfortable.	
		INPR3	The anchor frequently employs professional terms during the product recommendation process.	
Environment Quality	Activeness	ENAC1	The music in the live broadcast is appealing to me.	(Tong X,2023; Yang Q,2023)
		ENAC2	Many people comment, like, or send flowers in the live broadcast.	
		ENAC3	Many people place orders while watching the ELS.	
	Convenience	ENCO1	The live interface or service can enhance the efficiency of my purchases.	
		ENCO2	ELS has been very effective in helping me find the stuffs I want.	
		ENCO3	It is convenient for me to return items after making purchases in ELS.	
Outcome Quality	Promotion	REPR1	The stuffs are priced lower compared to other stores.	(Davis,2001; Brady,2001)
		REPR2	The products in the live broadcast offer a better cost-performance ratio.	
		REPR3	The complimentary gifts, vouchers, and discounts after placing an order are very appealing to me.	
	Dependability	REDE1	I am concerned about the potential leakage of personal information after making purchases in the live broadcast.	
		REDE2	I'm concerned about purchasing products in the live stream that may not match the descriptions.	
		REDE3	I am concerned about purchasing counterfeit goods in the live broadcast.	

The initial scale for this study is presented in Table 4. To ensure the effectiveness of the research, the scale was designed by referencing mature scales in the academic field. Expert opinions were sought, and adjustments were made to the measurement items after multiple trial fillings to ensure accuracy and appropriateness. The survey collected data through random sampling, primarily using online questionnaires. The target participants were young individuals with consumer capabilities, including university students, employees, sole proprietors, and those working in administrative/career units. Participants were asked to recall their perceptions of the service quality of ELS during live streaming purchases using a 5-point Likert scale. The demographic characteristics of the surveyed population are presented in Table 5. According to the sample data, the majority of participants in this survey are in the 19-25 age group, with a focus on university students, predominantly holding undergraduate degrees. The frequency of live streaming viewing or purchasing is mainly concentrated on once a day or a few times a week. The majority of participants had been engaging in live streaming purchases for over a year. Thus, the survey sample is characterized by rich live streaming purchasing experiences and is representative, contributing to the accuracy and authenticity of the research data. A total of 398 questionnaires were collected in this survey. After removing 88 questionnaires from individuals who had not viewed or participated in ELS purchases or had randomly filled out the questionnaire, 310 valid questionnaires were obtained, resulting in an effective response rate of 77.89%.

Table 5. Demographic Characteristics of the Questionnaires

Classification		Frequency(n=310)	%	Classification		Frequency(n=310)	%	
Gender	Female	196	63.23	Average monthly (Disposable) Income	Below 1500	132	42.58	
	Male	114	36.77		1500-4000	108	34.84	
Age	Below 18	23	7.42		4000-6500	32	10.32	
	19-25	214	69.03		6500-9000	23	7.42	
	26-30	40	12.90		Above 9000	15	4.84	
	Above 30	33	10.65		Frequency of ELS watching/purchasing	Several times a day	39	12.58
Education	Elementary/Middle School	27	8.71			Once a day	66	21.29
	College graduate	67	21.61			Several times a week	69	22.26
	University graduate	194	62.58	Once a week		22	7.10	
	Postgraduate	22	7.10	Several times a month		62	20.00	
Occupation	Student	224	72.26	Once a month		52	16.77	
	Enterprise staff	37	11.94	purchase Age in ELS	Below 1	78	25.16	
	Self-employed	14	4.52		1-3	75	24.19	
	Administrative institution	19	6.13		3-5	80	25.81	
	others	16	5.16		5-7	58	18.71	
			Above 7		19	6.13		

Firstly, this study conducted an exploratory factor analysis on the 18 measurement items of the scale to examine and refine its dimensions, assessing whether the extracted common factors for each variable were representative to determine the validity of the scale, as shown in Table 6. The validity test revealed that the KMO values for each item (0.768-0.901) were all greater than 0.6. The significance p-value was 0.000. The item factor loadings (0.480-0.855) and communalities (0.413-0.739) were all higher than 0.4. The cumulative variance explained (61.268%-67.382%) exceeded 50%, indicating that the items were effective, and the structural validity was relatively good. This study utilized the SPSS 26.0 data analysis tool to calculate Cronbach's alpha coefficients for different variables, as shown in Table 7. The Cronbach's alpha values for each variable (0.796-0.899) were all higher than 0.70, indicating good reliability. The overall coefficient was 0.934, signifying overall data reliability. Therefore, the validity and reliability of this survey questionnaire meet the requirements.

Table 6. The Service Quality of ELS: Validity Analysis

Construct	Scale Items	Estimate	Communality	PCA	KMO	Bartlett's sphericity test
Interaction Quality	INEN1	.701	.523	66.654%	.898	.000
	INEN2	.843	.714			
	INEN3	.678	.547			
	INPR1	.726	.600			
	INPR2	.788	.692			
	INPR3	.775	.642			
Environment Quality	ENAC1	.686	.508	61.268%	.901	.000
	ENAC2	.677	.492			
	ENAC3	.689	.578			
	ENCO1	.812	.674			
	ENCO2	.619	.501			
	ENCO3	.802	.644			
Outcome Quality	REPR1	.480	.413	67.382%	.768	.000
	REPR2	.706	.584			
	REPR3	.494	.474			
	REDE1	.640	.457			
	REDE2	.855	.739			
	REDE3	.846	.721			

Table 7. The Service Quality of ELS: Reliability Analysis

Construct	Measurement index	Items	Cronbach's Alpha		Cronbach's Alpha
Interaction Quality	Entertainment	3	.793	.899	.934
	Professionalism	3	.859		
Environment Quality	Activeness	3	.766	.873	
	Convenience	3	.806		
Outcome Quality	Promotion	3	.749	.796	
	Dependability	3	.760		

3.3. Scale Validity Testing

Table 8. Final Scale of the Service Quality of ELS

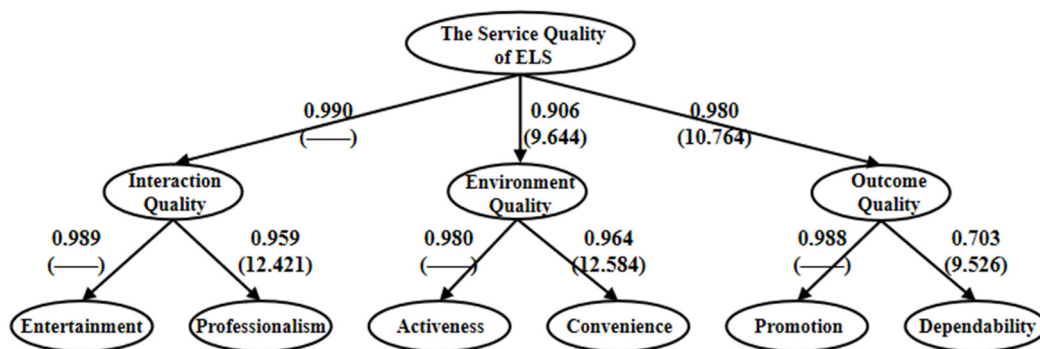
Second-Order Themes	First-Order Concepts	Scale Items	CFA	Cronbach α	CR	AVE
Interaction Quality	Entertainment	The anchor 's appearance, voice, personality, or style is very appealing to me.	.716	.793	.799	.570
		I find it especially enjoyable to participate in interactions within the e-commerce live broadcast.	.815			
		The e-commerce anchor makes me feel curious and entertained when showcasing products.	.731			
	Professionalism	The anchor emphasizes providing detailed introductions of the products when recommending them.	.779	.859	.858	.668
		The customer service's attitude makes me feel very comfortable.	.856			
		The anchor frequently employs professional terms during the product recommendation process.	.815			
Environment Quality	Activeness	The music in the live broadcast is appealing to me.	.726	.766	.773	.531
		Many people comment, like, or send flowers in the live broadcast.	.703			
		Many people place orders while watching the ELS.	.756			
	Convenience	The live interface or service can enhance the efficiency of my purchases.	.802	.806	.804	.578
		ELS has been very effective in helping me find the stuffs I want.	.697			
		It is convenient for me to return items after making purchases in ELS.	.779			
Outcome Quality	Promotion	The stuffs are priced lower compared to other stores.	.650	.767	.707	.549
		The products in the live broadcast offer a better cost-performance ratio.	.672			
	Dependability	The complimentary gifts, vouchers, and discounts after placing an order are very appealing to me.	.756	.760	.802	.575
		I am concerned about the potential leakage of personal information after making purchases in the live broadcast.	.779			
		I'm concerned about purchasing products in the live stream that may not match the descriptions.	.795			

This study conducted confirmatory factor analysis on the 6 factors and 18 measurement items to validate the scale's effectiveness and evaluate the model's goodness of fit. The first-order and second-order analyses were performed using the AMOS 26.0 data analysis tool. Through data analysis, it was found that the affordability item (REPR1) had a loading coefficient of 0.581, which is less than 0.6. After removing this item and re-evaluating, all standardized loading coefficients were greater than 0.6, indicating good measurement relationships and a well-fitting model. Cronbach's alpha values (0.760-0.859) were higher than 0.70. The average variance extracted values (0.531-0.668) exceeded the standard coefficient of 0.5. The composite reliability values (0.707-0.858) were higher than the benchmark coefficient of 0.7, indicating good convergent validity, as shown in Table 8. The maximum correlation coefficients between factors were all less than the square root of the corresponding average variance extracted, indicating good discriminant validity among dimensions, as shown in Table 9. The study then conducted an overall evaluation of the measurement model for e-commerce the service quality of ELS. The chi-square degrees of freedom ratio was 2.623, falling between 0 and 3. Additionally, GFI=0.903, CFI=0.939, IFI=0.940, TLI=0.926, RMR=0.05, RMSEA=0.072. All these values met their corresponding benchmarks, indicating that the model has good structural validity, as illustrated in Figure 2. This suggests that the multi-level structure of e-

commerce the service quality of ELS, composed of interaction quality, environment quality, outcome quality, and their 6 sub-dimensions, is statistically valid.

Table 9. The Service Quality of ELS: Discriminant Validity

Factor	Initial items	Final items	Correlation Matrix					
			1	2	3	4	5	6
Entertainment	3	3	1.00					
Professionalism	3	3	.496	1.00				
Activeness	3	3	.463	.564	1.00			
Convenience	3	3	.513	.575	.525	1.00		
Promotion	3	2	.432	.499	.464	.467	1.00	
Dependability	3	3	.355	.596	.400	.526	.475	1.00
AVG			3.735	3.911	3.553	3.597	3.569	3.549
SD			.823	.825	.834	.811	.756	.787
CR			.799	.858	.773	.804	.707	.802
AVE			.570	.668	.531	.578	.549	.575
Model Fit	X ² =293.732(d.f.=112); p=0.000,GFI=0.903,CFI=0.939,IFI=0.940,TLI=0.926,RMR=0.05,RMSEA=0.072							



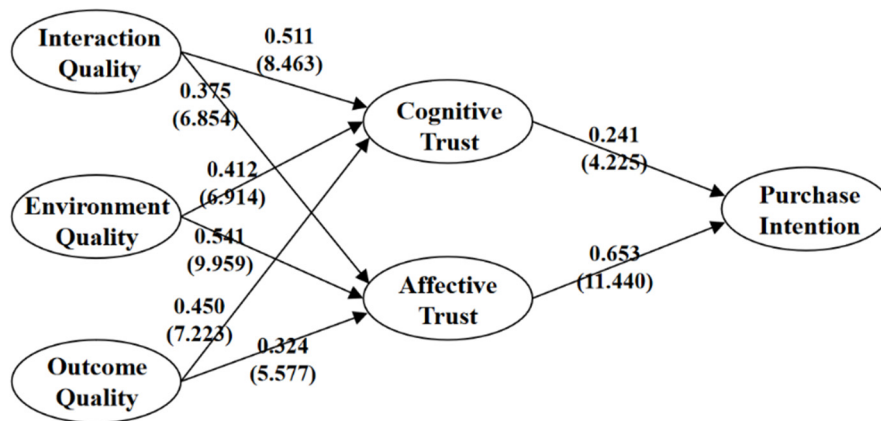
Note: X²=293.732 (d.f.=112) ;
 p=0.000, GFI=0.903, CFI=0.939, IFI=0.940, TLI=0.926, RMR=0.05, RMSEA=0.072

Figure 2. Measurement Model of the Service Quality of ELS

3.4. Predictive Validity Testing

To further examine the predictive validity of the conceptual model of the Service Quality of ELS and its measurement dimensions, this study selected three criterion variables—Consumer cognitive trust, affective trust, and purchase intention—to assess the predictive ability of the scale. Trust is known to facilitate consumer purchasing, especially in highly uncertain environments like the internet [22]. Consumer purchase intention is directly linked to live streaming performance. Existing research has already confirmed the logical relationships between service quality, consumer cognitive trust, affective trust, and purchase intention [23][24]. During the implementation of the questionnaire survey for the scale, this study has collected measurement data for criterion variables. Specifically, the measurement of consumer cognitive trust was adapted from Mayer and Doney [25][26]. For the measurement of consumer affective trust, it followed the work of Rotter and Holton [27][22]. The measurement of consumer purchase intention was adapted from Zeithaml [28]. Drawing on mature measurement items from both domestic and international sources ensures the accuracy and scientific validity of the collected data.

This study considered the three dimensions of the service quality of ELS—Interaction quality, environment quality, and outcome quality—as independent variables. A relationship model was constructed with three criterion variables: consumer cognitive trust ($\alpha=0.878$; $CR=0.880$; $AVE=0.648$), affective trust ($\alpha=0.836$; $CR=0.839$; $AVE=0.567$), and consumer purchase intention ($\alpha=0.887$; $CR=0.888$; $AVE=0.667$). The relationship model was evaluated using the refined measurement items obtained through purification. The results, as shown in Figure 3, indicate that the three dimensions of the service quality of ELS have predictive utility for both consumer cognitive trust and affective trust, thereby influencing consumer purchase intention. According to the data, the three dimensions of the service quality of ELS have varying impacts on consumer cognitive trust and affective trust. Therefore, it can be inferred that the measurement dimensions in this study exhibit good discriminant validity and overall methodological validity.



Note: $\chi^2=1764.352$ (d.f.=657) ; $p=0.000$, $CFI=0.923$, $NFI=0.922$, $IFI=0.924$, $RMR=0.035$, $RMSA=0.033$

Figure 3. Predictive Validity Test Result

4. Results

This study, through in-depth interviews and empirical testing, developed a measurement scale for the service quality of ELS and reached the following conclusions: Firstly, the service quality of ELS includes three dimensions: interaction quality, environment quality, and outcome quality. Specifically, interaction quality is measured through the sub-dimensions of entertainment and professionalism; environment quality is measured through the sub-dimensions of activeness and convenience; outcome quality is measured through the sub-dimensions of promotion and dependability. Secondly, the impact of the constituting dimensions of the service quality of ELS on the overall service quality is ranked from the highest to the lowest as interaction quality, outcome quality, and environment quality. This indicates that, in the context of ELS, consumers are particularly concerned about the interaction and communication experience with anchors, customer service, and other live streaming staff. Following that, they prioritize the outcomes of live streaming purchases, while environmental factors such as the ambiance of the live streaming and the user interface are considered less crucial. Thirdly, the service quality of ELS has a significant predictive effect on consumer cognitive trust, affective trust, and purchase intention. The predictive impact of the constituting dimensions on consumer cognitive trust, from highest to lowest, is interaction quality, outcome quality, and environment quality. The predictive impact on affective trust, from highest to lowest, is environment quality, interaction quality, and outcome quality. This suggests that the interaction level between live streamers and consumers is a key factor influencing consumer trust and recognition of a business's capabilities. Additionally, the perceived gain after a live streaming purchase and the environmental factors during the live streaming purchase are crucial in influencing consumer cognitive trust. The

live streaming ambiance and user interface are identified as the most critical factors affecting consumer affective trust. The more vibrant the live streaming ambiance and the more user-friendly the purchasing interface, the higher the level of pleasure, comfort, trust, and affection consumers associate with the business. Interactions with the business and the purchasing outcomes also play important roles in influencing consumer affective trust.

5. Summary

In terms of theoretical contributions, existing research on service quality is abundant, but there is a limited focus on ELS as a research object. This study explores and develops measurement dimensions specifically for the service quality of ELS, systematically revealing the dimensions of interaction quality, environment quality, and outcome quality. Each dimension encompasses two sub-dimensions, and criterion variables are selected to test the predictive ability of the measurement scale. The study finds that interaction quality plays a primary role in the service quality of ELS. In the context of ELS, interaction quality is identified as the foremost factor influencing consumer cognitive trust, while environment quality is the primary factor influencing consumer affective trust. The research provides a tool for measuring the service quality of ELS, enriches relevant theories on service quality and ELS.

The research provides managerial insights for formulating marketing strategies for ELS operators. ELS hosts, merchants, and e-commerce platforms can tailor strategies based on the relative contributions of dimensions in the service quality of ELS, prioritizing interaction quality, outcome quality, and environment quality to enhance consumer cognitive trust, affective trust, and stimulate purchases, ultimately gaining a larger market share.

However, The data collection was conducted through an online questionnaire, with a focus on young people in the vicinity. Consequently, the research form and sample population were relatively narrow, with a concentrated age group, leading to weaker generalizability of the results. And the questionnaire design had a relatively low number of items for each dimension, and during data analysis, some items were deleted due to the high requirements of the analysis tool, affecting the accuracy and completeness of the scale. In future research, expanding the age range and geographical scope of sample collection, diversifying data collection methods, and exploring the use of big data to rapidly obtain relevant data from ELS users for research purposes are recommended. Employing various analytical methods in statistical analysis can enhance the scientific rigor of the research. Given the complexity of services, ELS services and their measurement dimensions deserve deeper and broader investigation. Remedial actions after service provision can also be studied as part of quality assessment. Due to variations in consumers' perceptions of service quality, few studies have differentiated research among groups with different perceptions. Future research should consider distinguishing groups based on social background, income levels, educational attainment, and other attributes for a more comprehensive analysis.

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