

A study on the impact of rural e-commerce live customer value co-creation interaction behavior on customer relationship

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Abstract—Rural e-commerce live streaming is an emerging marketing model in the era of the Internet in China. In a complex network environment, multiple stakeholders exchange services, integrate resources, and achieve value co creation. This article explores the influencing factors of customer value co creation and interactive behavior in e-commerce live streaming from a customer perspective, as well as their impact on customer relationships. Through empirical research, the following conclusions can be drawn: trust has a significant impact on product interaction, interpersonal interaction, and media interaction; Subjective norms have a significant impact on interpersonal and media interaction, while their impact on product interaction is not significant; Product interaction has a significant impact on relationship construction, but has no significant impact on relationship deepening; Interpersonal communication has a significant impact on the construction and deepening of relationships; Media interaction has a significant impact on the construction and deepening of relationships.

Keywords- *value co-creation; rural e-commerce; live e-commerce; customer relationship*

I. INTRODUCTION

Through the technical advantages of the Internet platform and the scale of the audience, the live broadcast of e-commerce will show the enterprise products to customers in a more intuitive presentation and dynamic interactive form, in order to attract customers to buy, enhance brand value and close the relationship between customers and enterprises and other purposes. The most important feature of live e-commerce is the interaction between buyers and sellers, which generates greater value through interaction, and the value co-creation process of live e-commerce. In the complex network environment, the subjects involved in value co-creation in the live e-commerce process are increasing, but the customer is always one of the core subjects of value co-creation. However, in the process of value co-creation in the live e-commerce context, the interaction practice of customers also exposes the real problems in information acquisition, trust crisis and customer relationship management. In the actual live broadcast process, the high-intensity instant interaction in the live broadcast room brings a ponderous flow of information, and it is difficult to get feedback or response to individual interaction behaviors, so the effect of customers' efficient access to the required information is doubtful. At the same time, the frequent incidents of anchor flopping and product quality falsification have caused customers' doubts about the authenticity of live information, which also affects customers' intention to make further purchases, build and deepen customer relationships, etc. The above realistic problems from the perspective of cognitive value co-creation interactive behavior can be organized as follows: (1) How do customers cognize the interactive behavior of value co-creation in e-commerce live broadcast? (2) Does the degree of customer trust and social norms have an impact on the interactive behavior of value co-creation in live e-commerce? (3) What impact does customer participation in value co-creation interaction behavior have on the construction or deepening of customer relationships?

II. THEORETICAL MODEL AND RESEARCH HYPOTHESIS

The concept of value co-creation was first proposed by Norman and Ramirez(1993)[1]. Value is created through cooperation and collaboration between producers and consumers in various stages of the business process. The core of value co-creation lies in experiential value[2]. The process of value co-creation is accompanied by the interactive behaviors and interactive relationships of the participating subjects, and interaction is the behavioral trajectory of value co-creation[3]. In the live e-commerce scenario, customer value co-creation interaction behaviors can generally be divided into product interaction, interpersonal interaction and media interaction[4], and each of the three interactions revolves around product information acquisition behaviors (such as watching, asking or asking for help, etc.), interpersonal communication behaviors (such as responding, sharing, helping, etc.) and value extension behaviors based on the media itself (such as buying, following, recommending, etc.). Value co-creation can more efficiently meet the needs of consumers and achieve efficient resource integration[5]. According to the general theoretical model of online trust, trust affects the willingness of online users to give and receive information, which in turn affects the value co-creation behavior of giving information interaction[6]. In the context of live e-commerce, customers are not independent subjects, and they are affected by the environmental pressure brought by the important people around them and the live audience. Based on the TAM theoretical model, customers' perceived environmental pressure affects the possibility of participating in value co-creation interaction behaviors[7]. More

importantly, the main reason why customers are willing to establish and deepen relationships with companies is that customers believe that companies will bring value to them[8]. Based on this, this paper argues that trust and subjective norms will have an impact on value co-creation interaction behaviors, and value co-creation behaviors of companies and customers will have an impact on the construction and deepening of customer relationships, thus constructing the theoretical model of this study, as shown in Fig.1.

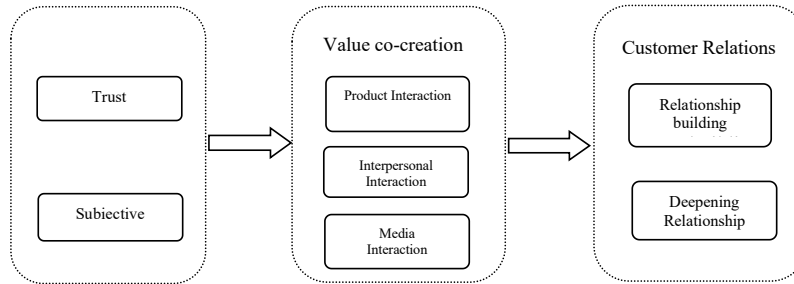


FIGURE I. THEORETICAL RESEARCH MODEL

A. Trust and value co-creation interactive behavior

In the live e-commerce context, trust is the precondition and attitude expression of customers' willingness to participate in interactive behavior. Trust affects the willingness to give and receive information, which in turn affects the value co-creation behavior of giving information interactions[9]. The degree of customers' cognition and emotion will enhance trust, and consumers' perceptions about benefits will also help consumers to generate trust[10]. Therefore, this paper argues that in the process of realizing the value co-creation interaction behavior of live e-commerce, trust as attitude can be pointed to the intention of interaction behavior and linked to the value co-creation interaction behavior of customers, which leads to the following research hypothesis:

H1a: There is a significant positive effect of trust on customers' product interaction behavior.

H1b: There is a significant positive effect of trust on the interpersonal interaction behavior of customers.

H1c: There is a significant positive effect of trust on customers' media interaction behavior.

B. Subjective norms and value co-creation interactive behavior

Subjective norm refers to the social pressure felt by individuals to take a certain action, and is an important variable to analyze the influence of the pressure formed by the social environment on user behavior in online shopping, especially in the strong interactive environment of live streaming, the relationship between subjective norm and willingness to interact will be more obvious[11]. In addition to the live environment factor, live e-commerce as a channel for online shopping and entertainment is widely used in people's lives, and the "many-to-many" interaction scenario in the live room constitutes a timely social network, and each subject's interaction behavior will be influenced by other individuals or groups' communication, sharing and discussion behaviors[12,13]. This leads to the following research hypotheses:

H2a: There is a significant positive effect of subjective norms on customers' product interaction behavior.

H2b: There is a significant positive effect of subjective norms on customers' interpersonal interaction behavior.

H2c: There is a significant positive effect of subjective norms on customers' media interaction behavior.

C. Value co-creation interaction behavior and customer relationship

Modern enterprises understand the new needs of customers at a deep level through interaction and interaction, innovate goods and services for customers, promote customer transactions and realize customer value. In the live e-commerce scenario, the construction of customer relationship is to attract potential customers and build the relationship between enterprises and customers through online interaction, while the deepening of customer relationship lies in enhancing the contact between enterprises and customers, improving emotional communication, forming a solid customer relationship, improving the quality of the relationship, enhancing customer reliance, and increasing the willingness of customers to share and consume. All value propositions related to customers help to increase the chance of customer participation in value co-creation interactions, and along with the in-depth understanding of customers in the interaction process, companies will have more opportunities to deepen customer relationships[14]. The role of the value co-creation interaction behavior of broadcasters is to provide customers with resources they can use or other resources available to them, which can facilitate the value co-creation interaction behavior, reduce uncertainty, and thus build long-term stable relationships with customers[15]. This leads to the following research hypothesis:

H3a: There is a significant positive effect of customers' product interaction behavior on customer relationship construction.

H4a: There is a significant positive effect of customers' interpersonal interaction behavior on customer relationship construction.

H5a: There is a significant positive effect of customers' media interaction behavior on customer relationship construction.

H3b: There is a significant positive effect of customers' product interaction behavior on customer relationship deepening.

H4b: There is a significant positive effect of customers' interpersonal interaction behavior on customer relationship deepening.

H5b: There is a significant positive effect of customers' media interaction behavior on customer relationship deepening.

III. EMPIRICAL ANALYSIS

A. Questionnaire design and data collection

Based on the above theoretical analysis, a questionnaire was designed to verify the scientific validity of the theoretical model and research hypothesis. The questionnaire consists of four main parts: trust scale, subjective norm scale, value co-creation interaction behavior scale and customer relationship scale. Among them, the trust scale confirms the trustworthiness of the information obtained from three sources: the content of the rural e-commerce live broadcast, the anchor, and other viewers; the subjective normative scale mainly describes the influence of customers in the rural e-commerce live broadcast context by the environmental pressure brought by the important people around them and the audience group in the live broadcast; the value co-creation interaction behavior scale is conducted from three dimensions: product interaction, interpersonal interaction, and The customer relationship scale is designed to measure two dimensions, namely customer relationship construction and customer relationship deepening, and three questions are designed for each dimension. The questionnaire uses a Likert 5-point scale to record the evaluation attitudes of respondents from "very compliant" to "very non-compliant", and scores them from 5 to 1. Experts in related fields were invited to evaluate the questionnaire, and the questionnaire was revised several times according to their opinions.

The questionnaires were distributed through a combination of online and offline methods, and the survey targets mainly focused on the personnel engaged in rural e-commerce live operation and management in Anhui, Zhejiang, Jiangsu and other regions. A total of 500 questionnaires were distributed, and 465 valid questionnaires were collected, with a valid recovery rate of 93%.

B. Reliability and validity tests

In this study, the LISREL 8.80 software was used to test the reliability and validity of the sample data, and the standardized factor loading values, CR values, and AVE values of each observed variable could be calculated and used to test the reliability and validity in the scale, and the results are shown in Tab.1.

TABLE I. RESULTS OF VALIDATION FACTOR ANALYSIS

Latent variable	Observation variable	Standardized factor loadings	AVE	CR
Trust	T1	0.78	0.558	0.791
	T2	0.75		
	T3	0.71		
Subjective Norms	SN1	0.72	0.559	0.791
	SN2	0.80		
	SN3	0.72		
Product Interaction	PI1	0.67	0.571	0.799
	PI2	0.81		
	PI3	0.78		
Interpersonal Interaction	HI1	0.65	0.689	0.866
	HI2	0.95		
	HI3	0.86		
Media Interaction	MI1	0.82	0.569	0.796
	MI2	0.79		
	MI3	0.64		
Relationship Building	RB1	0.98	0.771	0.906
	RB2	0.61		
	RB3	0.99		
Relationship	RD1	0.84	0.611	0.824

Deepening	RD2	0.73
	RD3	0.77

C. Model analysis and hypothesis testing

To further validate the theoretical model and hypothesized relationships, this study used Lisrel 8.80 software to analyze the impact model of rural e-commerce live customer value co-creation behavior on customer relationships to verify the various hypothesized relationships proposed in this study. In the process of model analysis, the theoretical model was continuously revised using the magnitude of the modification index (MI) and T-value, and the final standardized path diagram of the revised relationship model of the impact of rural e-commerce live customer value co-creation behavior on customer relationship was obtained, as shown in Fig.2. From the calculation results of the common fit indices (see Tab. 2.), the value of χ^2/df is 3.205, which is less than the upper reference value of 5; the values of the parameters GFI, AGFI, CFI, NFI and IFI are all greater than 0.8; the value of RMSEA is 0.094, which is lower than the upper reference value of 0.10, although it is higher than the ideal value of 0.05. Therefore, the measurement model can be considered as having validity. The results of testing the relevant theoretical hypotheses are shown in Tab.3.

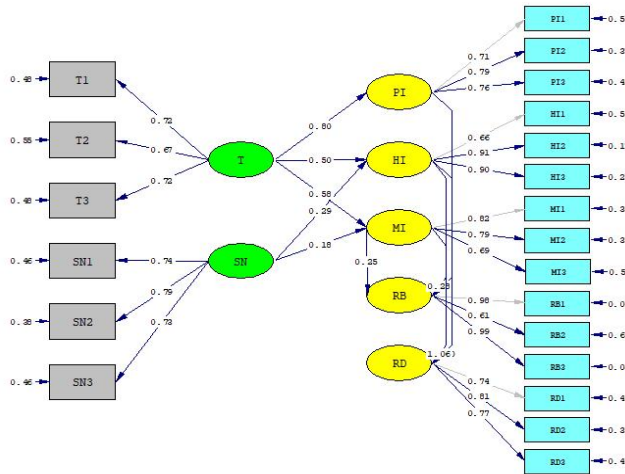


FIGURE II. STRUCTURE OF SEM NORMALIZED PATH COEFFICIENTS

TABLE II. TABLE OF SEM FITTING COEFFICIENT RESULTS

Fitting index	χ^2/df	GFI	AGFI	CFI	NFI	IFI	RMSEA
Numerical value	3.205	0.81	0.76	0.96	0.94	0.96	0.094

TABLE III. TEST RESULTS OF PATH RELATIONSHIP AND RELATED HYPOTHESES

Theoretical assumptions	Action path	Standardized path coefficient	t-value	Does it support the hypothesis
H1a	Trust→Product Interaction	0.80	8.63***	Yes
H1b	Trust→Interpersonal Interaction	0.50	4.42***	Yes
H1c	Trust→Media Interaction	0.58	5.19***	Yes
H2a	Subjective Norms→Product Interaction	0.14	1.78	No

H2b	Subjective Norms→Interpersonal Interaction	0.29	2.64**	Yes
H2c	Subjective Norms→Media Interaction	0.18	1.81*	Yes
H3a	Product Interaction→Relationship Building	0.24	2.7**	Yes
H3b	Product Interaction→Relationship Deepening	0.03	0.48	No
H4a	Interpersonal Interaction→Relationship Building	0.28	3.34***	Yes
H4b	Interpersonal Interaction→Relationship Deepening	1.06	10.63***	Yes
H5a	Media Interaction→Relationship Building	0.25	3.34***	Yes
H5b	Media Interaction→Relationship Deepening	0.24	3.31***	Yes

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

From Fig.2 and Tab.3, it can be seen that trust has a significant effect on product interaction, interpersonal interaction and media interaction, hypotheses H1a, H1b and H1c were tested; subjective norms have a significant effect on interpersonal interaction and media interaction, but not on product interaction, hypotheses H2b and H2c were tested, hypothesis H2a did not pass the test; product interaction has a significant effect on relationship construction Hypothesis H3a was verified, while Hypothesis H3b did not pass the test; interpersonal interaction had a significant effect on relationship construction and relationship deepening, and Hypothesis H4a and H4b were verified; media interaction had a significant effect on relationship construction and relationship deepening, and Hypothesis H5a and H5b had a significant effect. In addition, based on the validation results we can find that interpersonal interaction has the greatest overall effect on relationship deepening.

IV. CONCLUSION

Based on the main line of "interaction is a behavioral trajectory in the process of value co-creation", this paper explores the relationship between customer trust, subjective norm, value co-creation interaction behavior and customer relationship in the field of live rural e-commerce in China. Analytical tests were conducted to validate the theoretical model constructed in this study, and the main conclusions were obtained as follows:

Customer trust is one of the important factors affecting customer participation in deep value co-creation. The empirical research results show that customer trust has a significant positive impact on the interaction behavior of rural e-commerce live value co-creation. Product interaction mainly revolves around product information, the purpose of which is to obtain product information from live related subjects; interpersonal interaction is the communication and feedback behavior with other subjects; media interaction reflects the customer's attention to the platform, enterprise or anchor, recommendation and other interactive behavior. In the face of the large amount of information resources in the live broadcast, customers get the part that is valuable to them from the interaction with the corresponding subject, and can determine the perceived usefulness of the information, and strengthen the willingness to consult and seek help for product information, which helps to carry out further discussion, communication, attention, forwarding and recommendation behavior. Multiple subjects such as anchors, merchants and platforms in rural e-commerce live broadcast together constitute the trusted, and customer trust should return to the goods themselves are the support of institutional trust, technical trust and even personality trust.

Customers are easily influenced by other individuals or groups to watch rural e-commerce live and participate in interpersonal and media interaction behaviors, which can be expressed as an interactive atmosphere or environmental pressure perceived by customers. The results of the empirical study show that customers' subjective norms significantly affect interpersonal and media interactions, indicating that the stronger the customer's perception of the environment, the stronger the customer's intention to participate in communication and exchange and give feedback on the interaction. Subjective norms do not have a significant impact on product interaction, indicating that based on the customer's own demand for product information, their subjective norms are influenced by others to a more limited extent. From the actual rural e-commerce live broadcast, the platform and anchor should manage the pop-ups and comments in the live broadcast, and guide the audience to jointly build a positive interactive live broadcast environment to effectively enhance the live broadcast effect and indirectly strengthen the interpersonal and media interaction in the live broadcast.

Rural e-commerce live value co-creation interaction behavior is an important factor to build and deepen the relationship between customers, enterprises and platforms. The results of the empirical study show that most of the product interaction, interpersonal interaction and media interaction of rural e-commerce live value co-creation are conducive to the construction and deepening of customer relationships, which fully indicates that customers voluntarily or guided by enterprises to make different value co-creation interaction behavior, which will have different degrees of impact on the

relationship between customers and enterprises. The impact of product interaction on customer relationship deepening is not significant, reflecting the limited role of product interaction on further deepening customer relationship from the perspective of customer demand for products. Therefore, both rural e-commerce enterprises or live platforms should create a good interactive atmosphere. Design and construction of different interactive process system, training service personnel and customer communication skills, reasonable guidance of customer-to-customer communication, prompting customers to show a positive and friendly image, and enhance the interactive behavior of customers, enterprises and platforms, so as to enhance the willingness of customer interaction and better customer relationship management.

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