Research Article

Research on Dynamic Evaluation Modeling of Community e-Commerce Service Satisfaction under the Background of New Retail

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In order to improve the evaluation quality of community e-commerce service satisfaction, this study designs a new dynamic evaluation modeling method of community e-commerce service satisfaction under the background of new retail. After analyzing the community e-commerce service model under the new retail background, three primary indicators including commodity, distribution, and technology indicators and 14 secondary community e-commerce service satisfaction evaluation indicators are selected to complete the dynamic evaluation of community e-commerce service satisfaction through index clustering and satisfaction information clustering. The experimental results show that the evaluation time of this method varies from 7.5 min to 18.8 min, the accuracy of satisfaction information collection varies from 87.2% to 97.4%, and the highest evaluation accuracy can reach 98.1%, which prove that this method has higher evaluation efficiency and effectiveness and has strong application advantages.

1. Introduction

The new retail model is a newly upgraded Omni channel retail model, which combines the online e-commerce model with the offline physical sales model and optimizes the depth and technical level of retail services [1]. Under the new retail model, community e-commerce has made great progress. Community e-commerce has established a relatively complete consumer management system, which implements community transformation for consumers, so as to improve consumers’ purchasing power and communication power [2, 3].

With the fast expansion of the social economy, consumer buying power is gradually increasing. Consumers want to increase their own consumption levels, but their expectations for community e-commerce service quality have also risen [4]. As a result, it is critical to keep improving the service quality of community e-commerce in the new retail environment based on customer happiness.

As a result, Li [5] presents a grey model-based development technique for e-commerce service customer satisfaction assessment models. This technique builds applicable assessment systems, constructs scientific concepts, and picks evaluation indicators from three aspects: brand image, service quality, and service efficiency. The weight value of each evaluation index is created by examining the consistency of the matrix, and then, the happiness of e-commerce service clients is assessed by calculating the grey correlation coefficient and grey weighted correlation degree of each index. A crude set-based design strategy for an e-commerce logistics service quality assessment model is proposed in [6]. This approach determines the weight value of the e-commerce logistics service evaluation index by judging attribute value reduction and attribute significance via rough set classification after finishing equivalence class division. Then, according to the questionnaire results, summarize the actual evaluation results and expected level of consumers’ e-commerce logistics service quality and then verify the rationality of each index weight according to customer
satisfaction. Gao and Jia [7] propose a construction method of the cross-border e-commerce consumer satisfaction empirical evaluation model based on ECSI. This method is based on the consumer satisfaction index model and establishes the cross-border e-commerce consumer satisfaction index system by screening relevant indicators. Then, according to the actual survey, clarify the impact path of cross-border e-commerce consumer satisfaction. Based on this, the empirical evaluation of satisfaction is completed from the perspectives of service quality, brand image, and hardware quality.

However, in the long-term practical application, it is found that the above methods are not ideal in terms of evaluation time-consuming and evaluation accuracy, and the collection effect of satisfaction information needs to be improved. To solve these problems, this study designs a new dynamic evaluation modeling of community e-commerce service satisfaction under the background of new retail.

2. Research on Community e-Commerce Service under the Background of New Retail

2.1. Analysis of the Community e-Commerce Model under the Background of New Retail. Providing consumers with goods and services is the commercial essence of the retail industry. Whether it is the emerging e-commerce industry or the traditional offline entity industry, the essence of its core business is the same. As there is no offline entity in the e-commerce industry, the expenditure on store rent and labor cost is greatly reduced, and the offline entity industry can provide better services for consumers by operating stores [8].

However, no matter whatever form of operation is used in the retail business, there are certain drawbacks. According to the present state of development, both e-commerce and physical sales have reached a point of saturation, and both are experiencing an industry ceiling [9, 10]. The fast development of current electronic technology has made it possible to integrate e-commerce with physical sales, resulting in the emergence of a new retail model.

An omni channel retail model, often known as a pan retail model [11, 12], is the new retail paradigm. Online e-commerce and offline physical sales are no longer two opposing business modes in this mode, but are instead moving toward integrated growth. The following are the features of the new retail model: the first is a deep integration of the sales industry and contemporary logistics, the second is to better fulfill consumer requirements, and the third is to continually extend the application depth of information technology.

Community e-commerce arose as a result of the ongoing development of the new retail model [13]. Community e-commerce is a comprehensive consumer management system that completely engages and precipitates customers via the use of community-based consumer divisions. The conventional consumer management scenario is abandoned in favor of social e-commerce, which employs social networks to achieve social transformation for individual customers and then uses media tools to completely boost consumer involvement in the community and excite their communication capacity. The community e-commerce concept may be used not just for conventional e-commerce but also for mobile e-commerce and microcommerce [14–16]. Therefore, in order to further improve the service quality of community e-commerce, this study dynamically evaluates the service satisfaction of community e-commerce under the new retail background.

2.2. Consumer Perception Process of Community e-Commerce Service Quality. After a large-scale practical investigation on the service quality of community e-commerce, it is not difficult to find that service quality is a relative standard rather than an absolute concept [17, 18]. Consumer satisfaction with community e-commerce services is determined by a comparison of their expectations before to consumption and their actual sentiments after consumption. Consumer satisfaction will rise if the service supplied by community e-commerce surpasses the anticipated value. They believe that the service quality is high, and the probability of consumers buying again will increase. If the actual feeling of consumers is similar to the expected effect, consumers will think that the service quality of community e-commerce is relatively general. If the actual feeling of consumers is lower than the expectation before consumption, it is difficult for consumers to buy again [19].

The process of consumers’ perception of community e-commerce service quality is shown in Figure 1.

2.3. Community e-Commerce Service Satisfaction Model Measurement. There are many methods to measure the service quality of community e-commerce, and the company mainly selects the following two types:

2.3.1. Cognitive Service Quality Model. The quality of cognitive service is determined by the gap between ideal service and cognitive service. The perceived quality of service pattern is shown in Figure 2.

2.3.2. Service Quality Concept Model. The service quality concept model believes that, no matter what type of service, in order to meet the actual needs of customers, five gaps in the model need to be removed [20]. The service quality concept model is shown in Figure 3.

3. Dynamic Evaluation of Community e-Commerce Service Satisfaction

After analyzing the community e-commerce service model under the new retail background, the above analyzes the consumer perception process of community e-commerce service quality and measures the service satisfaction model. Based on the above analysis, this study designs relevant dynamic evaluation indicators to complete the evaluation of community e-commerce service satisfaction.
3.1. Evaluation Principle and Index Setting. The purpose of constructing the dynamic evaluation model of community e-commerce service satisfaction in this study is to more reasonably, systematically, and efficiently evaluate the service quality and market evaluation of community e-commerce services, so as to measure the development trend of community e-commerce and help it achieve longer-term development. Therefore, the following principles should be followed when setting dynamic evaluation indicators:

(1) Comprehensiveness: in order to achieve a broad variety of assessment outcomes, we need to examine the systematicness and comprehensiveness of the whole evaluation process while screening dynamic evaluation indicators. Different indicators should be independent of each other in the assessment process to avoid adding duplicate information in the evaluation process [21, 22].

(2) Rationality: when screening dynamic evaluation indicators, the selected indicators can scientifically reflect the development trend of community e-commerce. Regardless of the direction, the indicators can have a more objective evaluation.

Combined with the above principles, the evaluation indicators’ set in this study is as follows:

(1) Commodity indicators include completeness of commodity types, commodity quality, rationality of commodity price, and authenticity of commodity description

(2) Distribution indicators include distribution timeliness, distribution service quality, distribution after-sales quality, and distribution personnel quality
(3) Technical indicators include ease of operation of community e-commerce platform, personal information security, payment security, payment convenience, user experience, and consumer rights’ protection mechanism.

To sum up, this study designed 3 primary indicators and 14 secondary indicators to build the index system, as shown in Figure 4.

3.2. Dynamic Evaluation Process Design. Combined with the dynamic evaluation index system designed above, the service satisfaction of community e-commerce is evaluated. The process is as follows:

1. Commodity index $G_1$: the index is mainly based on the completeness of commodity types $g_{11}$, commodity quality $g_{12}$, commodity price reasonableness $g_{13}$, and the authenticity of the description $g_{14}$. The calculation process is as follows:

$$G_1 = \alpha (g_{11} + g_{12} + g_{13} + g_{14}),$$  \hspace{1cm} (1)

where $\alpha$ represents the weight value of commodity indicators.

2. Distribution index $G_2$: this indicator includes distribution timeliness $g_{21}$, distribution service quality $g_{22}$, after-sales quality $g_{23}$, and the quality of distribution personnel $g_{24}$. The calculation process of four secondary indicators is as follows:

$$G_2 = \beta (g_{21} + g_{22} + g_{23} + g_{24}),$$  \hspace{1cm} (2)

where $\beta$ represents the weight value of distribution indicators.

3. Technical index $G_3$: this indicator includes the operation convenience of social e-commerce platform $g_{31}$, personal information security $g_{32}$, payment security $g_{33}$, payment convenience $g_{34}$, user experience $g_{35}$, and consumer protection mechanism $g_{36}$. The calculation process of six secondary indicators is as follows:

$$G_3 = \varepsilon (g_{31} + g_{32} + g_{33} + g_{34} + g_{35} + g_{36}),$$  \hspace{1cm} (3)

where $\varepsilon$ represents the weight value of technical indicators.

Due to the difference between different index data, this difference will affect the quality of evaluation results [23–25]. Therefore, in order to avoid this problem, this study implements clustering processing on the above indicators and sample information, and the process is as follows:

Step 1: assume that the clustering weight of the $m$ secondary index is $\omega_m$. The benchmark function of evolution calculation is $f(m) = 0.5$.

Step 2: combined with $n$ three-level indicators, calculate the clustering weight as $\omega_{m_1}$, and the interval clustering coefficient of $m$ is as follows:

$$N_m^n = n \times \omega_m \times \sum_{m=1}^{M} f(m).$$  \hspace{1cm} (4)

Step 3: after collecting the relevant information of community e-commerce service satisfaction, randomly select a sample information $X_p$. Hypothesis $c_X$ represents the characteristic parameter of community e-commerce service satisfaction information, and the information characteristic membership is obtained by using the following formula:

$$D = C \times X_p \times c_X,$$  \hspace{1cm} (5)

where $C$ represents the characteristic parameter set of community e-commerce service satisfaction information.

Step 4: expand the community e-commerce service satisfaction information by calculating the distance between features, mainly through the European distance. The specific process is as follows:

$$L = D \times \left( \frac{1}{b} \sum_{b=2}^{r} (c_{ab} - c_{a(b-1)}) \right)^2,$$  \hspace{1cm} (6)

where $c_{ab}$ represents the $b$th characteristic parameter of the $a$th cluster center of community e-commerce service satisfaction information and $c_{a(b-1)}$ represents the $(b-1)$ characteristic parameter of the $a$th learning center of community e-commerce service satisfaction information.

Step 5: on this basis, the best number of clusters is determined by introducing the between-within-proportion (BWP) index, and the cluster dispersion distance of the class $J$ community e-commerce service satisfaction information sample data is used $L_1$ and cluster distance $D_1$ to more accurately reflect the tightness of community e-commerce service satisfaction information in the cluster.

Step 6: comprehensively analyze the interval clustering of indicators and the clustering of community e-commerce service satisfaction information, combined with the three primary indicators and 14 secondary indicators designed above, construct the dynamic evaluation process of community e-commerce service quality as follows:

$$Z = \sum_{i=1}^{3} G_i \times \frac{N_m^n \times X_p \times c_X \times L_1/D_1 \times D_1 / L \times f(m)}{L \times f(m)}.$$  \hspace{1cm} (7)

To sum up, after analyzing the community e-commerce service model under the new retail background, this study measures the service satisfaction model according to the consumer perception process of community e-commerce service quality. Then, three primary indicators and 14
4. Experiment and Result Analysis

The following simulation experiment analysis procedure is aimed to validate the practicability and efficacy of the dynamic assessment modeling of community e-commerce service satisfaction against the backdrop of new retail.

For example, suitable surveys are produced based on the determining aspects of consumer satisfaction in an e-commerce community. Three commodity, distribution, and technology variables are included in the questionnaire. The construction method of e-commerce service customer satisfaction evaluation model based on the grey model in [5] and the construction method of e-commerce logistics service quality evaluation model based on the rough set in [6] are compared to complete the performance verification with this method in order to avoid the singleness of the experimental results.

A total of 300 questionnaires were distributed in the experiment, and 296 qualified questionnaires were obtained after sorting out the recovered questionnaires. Cronbach’s alpha and ave of structural variables in different methods are calculated by SPSS statistical software. The calculation results are shown in Table 1.

By analyzing the results shown in Table 1, it can be seen that Cronbach’s alpha values of the three methods are above 0.75, which indicates that the three methods are reliable. Among them, the highest Cronbach’s alpha value of this method is 0.93, which shows that this method has higher stability. In terms of the ave value, the corresponding value of the method in this study is higher than that of the other two methods, and the highest ave value can reach 0.91. However, reference [5] method’s ave value is only 0.42, and reference [6] method’s ave value is only 0.38, indicating that the technique in this study has good validity and the efficacy of the dynamic assessment model of satisfaction is stronger.

On this foundation, the evaluation duration, satisfaction information collecting accuracy, and assessment accuracy are used as indicators to further verify the application performance of the three techniques. Among them, the evaluation time might show the effectiveness of various approaches in terms of assessment. The less the evaluation time, the higher the efficiency of the evaluation method, and the evaluation results can be obtained quickly in a shorter time. The accuracy of satisfaction information collection can reflect the reliability of different methods. The value range of satisfaction information collection accuracy is [0,1]. The closer the value is to 1, the higher the reliability of the evaluation method. The evaluation accuracy can directly
reflect the effectiveness of different evaluation methods. The higher the evaluation accuracy, the stronger the effectiveness of the evaluation method, and the more effective it can provide support for the development of community e-commerce. The specific experimental results are as follows.

4.1. Evaluation Time-Consuming Experiment. The evaluation time of different methods is counted, and the results are shown in Figure 5.

It can be seen from the findings in Figure 5 that, as the quantity of data grows, so does the time it takes for various approaches to evaluate it. The evaluation time varies from 24.3 min to 37.9 min after using reference [5] method; after using reference [6] method, the evaluation time varies from 18.1 min to 46.2 min as the number of experiments increases; after using this method, the evaluation time varies from 7.5 min to 18.8 min as the number of experiments increases. A thorough comparison reveals that this approach takes less time to evaluate, implying that its evaluation efficiency is greater and that assessment findings may be acquired more swiftly in less time.

4.2. Accuracy of Satisfaction Information Collection. Compare the accuracy of satisfaction information collection of this method, reference [5] method, and reference [6] method, and the results are shown in Figure 6.

By observing the results shown in Figure 6, it can be seen that, with the increase of the amount of data, the satisfaction information collection accuracy of different methods shows a trend of gradually decreasing. After applying reference [26] method, the accuracy of satisfaction information collection varies from 77.1% to 90.0%. After applying reference [6] method, with the increase of the number of experiments, the accuracy of satisfaction information collection varies from 76.5% to 93.6%. After the application of this method, with the increase of the number of experiments, the accuracy of satisfaction information collection varies from 87.2% to 97.4%. From the above results, the satisfaction information collection accuracy of this method is higher, which shows that the evaluation result of this method is more reliable.

4.3. Evaluation Accuracy. In the verification of this section, taking the evaluation accuracy as the index, the effectiveness of this method, reference [5] method, and reference [26] method is visually verified, and the results are shown in Figure 7.

By analyzing the results shown in Figure 7, it can be seen that, with the increase of the amount of data, the evaluation accuracy of different methods is gradually increasing. When the data volume is 200 GB, the evaluation accuracy of reference [5] method is 89.5%, that of reference [6] method is 87.4%, and that of this method is 92.8%. When the data volume is 1000 GB, the evaluation accuracy of reference [5] method is 95.3%, that of...
reference [6] method is 95.8%, and that of this method is 98.1%. Through the above comparison, it can be seen that the evaluation accuracy of this method is higher, indicating that this method is more effective and can provide efficient support for the development of community e-commerce.

To sum up, by comparing the three groups of experimental results, it can be seen that, under the new retail background designed in this study, the evaluation time of the dynamic evaluation modeling method of community e-commerce service satisfaction varies from 7.5 min to 18.8 min, the accuracy of satisfaction information collection varies from 87.2% to 97.4%, and its evaluation accuracy can reach 98.1% at the highest, with strong validity, It is proved that the evaluation efficiency and effectiveness of this method are higher.

5. Conclusion

This research develops a novel dynamic assessment modeling of community e-commerce service satisfaction against the backdrop of new retail in order to increase the timeliness and quality of satisfaction evaluation. This method examines the community e-commerce service mode against a new retail backdrop and then selects three primary indicators and fourteen secondary indicators, including commodity, distribution, and technology indicators, to complete the dynamic evaluation of community e-commerce service satisfaction through index clustering and satisfaction information clustering. According to the experimental findings, this technique takes less time to evaluate, has a high level of satisfaction information gathering accuracy, and can achieve an assessment accuracy of 98.1 percent, demonstrating that it meets the design expectation.

Data Availability

The data used to support the findings of this study are included within the article.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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