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Original Paper

SEM Model for The Fitness Club's Customer Satisfaction

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Abstract

After the end of the COVID-19 epidemic, people pay more and more attention to their health, especially how to better maintain good health. The gym starts to enter the streets and alleys for meeting people's pursuit of health, not only improving their physical fitness, but also releasing psychological pressure. In order to enhance the attractiveness of gyms, this article takes fitness club A in L City as an example and uses a satisfaction model to study how to improve the service level of gyms.

We conducted descriptive statistics on the basic information of the respondents, their willingness to purchase, and the reasons for their purchase. According to the analysis results, it can be concluded that fitness club A should change its existing charging model and guide its members in their consumption expectations; and most members choose clubs mainly based on factors that reflect the professionalism of the club, such as location, environment, equipment, and coaches.

This article uses the reflective measurement equation in structural equation modeling to analyze the customer satisfaction of fitness club A, establishes a causal relationship path diagram model, and modifies it. The path coefficient in the revised model is significant, indicating that the explicit variables in the model have a good explanatory power for the latent variables. The reliability test of the survey questionnaire showed good consistency; and the validity of the scale was evaluated based on convergent validity, and the results showed that the scale had good validity. Evaluate the model fitting from both subjective and objective perspectives, and the results show that the model fitting effect is good and the model structure is reasonable.

Keywords

the gym, customer satisfaction, SEM

1. Introduction

With the rapid development of China's economy and society, the living standards of Chinese people are rapidly improving and the material and cultural needs are undergoing great changes. People are gradually shifting from pursuing basic materials such as clothing, food, housing, and transportation to pursuing physical health and spiritual pleasure. Fitness exercises meet the current needs of the Chinese people, which can not only strengthen the body but also release the pressure and ease the tension. At the same time, a good mood is conducive to physical health. Fitness helps people to achieve physical and mental health, which is not only the absence of physical defects and diseases, but also a complete physical and mental state and social adaptability.

China's fitness industry officially started around 2000, lasted more than 10 years of development, in 2015 has reached thousands of millions, of which there are 5650 above the scale, the number of participants as many as 10 million people (Note 1). According to data from Sohu, in the year from April 2015 to March 2016, eight of the top ten Chinese cities with the most gyms saw their number increase by more than 50% (Note 2). It can be seen that China's fitness industry is not only developing rapidly but also has huge market potential. In recent years, China's industrial policies for the development of the industry have been introduced. In particular, The State Council issued the Guiding Opinions on Accelerating the Development of the Fitness and Leisure Industry on October 28, 2016 put forward a series of detailed goals, policies and measures. It pointing out that the size of the fitness and leisure industry will reach 3 trillion yuan by 2025. According to the scale of the existing health clubs, the number of health clubs corresponding to the scale of the industry will exceed 10,000. Faced with such a huge market and so many manufacturers, it is not easy for any club to occupy a place in the industry.

In order to win the market, different manufacturers adopt different strategies. Some manufacturers adopt a price strategy to minimize all costs and obtain the market space corresponding to low prices; some manufacturers adopt a comprehensive strategy to build almost all possible fitness projects. Some manufacturers adopt brand strategy to join the national well-known brands... Even so, the 2017 edition of data released by the China Industry Report network shows that the fitness clubs are basically consistent in hardware, the price war is fierce and the homogenization of competition is becoming increasingly serious. As a result, even the market leaders in the health club industry have turned to software development to increase customer cost performance, create market segments and boost profitability. Soft power construction is more difficult to implement than hardware construction. On the one hand, it is difficult to obtain leaders' recognition due to the invisibility of software construction. On the other hand, software construction requires long-term investment and and is challenging to complete quickly. At the same time, blind or unclear soft-power construction can lead to disaster rather than profit.

Structural Equation Modeling (SEM) is a research methodology based on statistical analysis techniques, which can be used to explore the relationships between variables and predict future trends. SEM is mainly used to solve multivariate problems in social science research, and to handle the exploration and analysis of complex and variable research data. In the past few decades, SEM has become one of the most commonly used methods in social sciences, education, psychology, and other fields. With the continuous development and application of computer technology, SEM has been increasingly widely used in practical research. In the field of medicine, SEM is widely used to explore the relationship between various health and biomedical issues. Awad et al. applied structural equation modeling to study the relationship between entrepreneurial leadership, proactive work behavior of nurses, and career adaptability (Awad et al., 2016). In the field of management, SEM is widely used to explore the relationships and impacts between various factors within a company. Wang Jiao applied structural equation modeling to study the audit quality evaluation model. In other fields, SEM is also widely used (Jiao, 2016). Eftekhari et al. applied structural equation modeling to evaluate the trust in building artificial intelligence collaborative robots (Eftekhari et al., 2024). Yue W et al. applied structural equation modeling to analyze the factors affecting plant diversity in urban wetlands (Yue et al., 2024).

SEM is constantly being updated and improved in both model construction and theoretical aspects. For example, in recent years, emerging methods such as Bayesian SEM and Machine Learning SEM have emerged to address the issues of high sample size requirements and difficulty in fitting complex models in traditional SEM methods. Lu et al. proposed an improved structural equation model estimation method using estimated latent variable scores and demonstrated the consistency of the new method (Lu et al., 2005). These emerging methods can not only better solve the problems existing in traditional SEM methods, but also better adapt to the needs of the big data era. Lee et al. used ant colony optimization for sensitivity analysis in structural equation modeling (Lee et al., 2022).

In terms of research on customer satisfaction in fitness clubs, structural equations have also received exceptional attention. Dabija et al. used structural equation modeling to investigate the impact of different personality types of the millennial generation on the tendency to recommend fitness centers (Dabija et al., 2023). Liu Bing verified that the structural model of the influencing factors of clubs has a positive impact on the path of potential variables (Bing, 2010). Liu Gaofu et al. used structural equation modeling to obtain that all dimensions of fitness club brand image contribute to improving customer perceived value and satisfaction levels (Gaofu, 2011). Yu Kun used the PLS structural equation model to find that perceived quality has the greatest direct impact on customer satisfaction (Kun, 2010). Of course, structural equation modeling is not the only method for studying customer satisfaction in fitness clubs. Yuan Zequan used one-way ANOVA and independent sample T-test to study the satisfaction status and customer influencing factors of fitness clubs (Zequan, 2023). Yang Shujie used descriptive statistics and factor analysis methods to study customer satisfaction in fitness clubs (Shujie, 2021). Li

Ke conducted a study on customer satisfaction in fitness clubs based on the Import Performance Analysis model (Ke, 2022). Miao Jingjing used a fuzzy comprehensive evaluation method to evaluate the satisfaction of fitness club members (Jingjing, 2021).

On the basis of previous research, this paper takes the leader fitness club A in L City as an example. Through data analysis, establish a structural equation model to explore how industry leaders can leverage their own advantages to improve existing services, enhance the soft power of clubs, improve the cost-effectiveness of customer fitness consumption, and achieve higher profitability. Through investigation and analysis of the members of fitness club A, this paper understands the basic development status of the fitness club in L City, understands the satisfaction of the old customers of the club to fitness club A. By analyzing the structural equation model, we can identify the improvement paths and measures for fitness club A, enhance its consumer loyalty and tap into new market potential, achieve effective maintenance of old customers and absorption of new customers, and improve business efficiency.

This paper is divided into five parts. Firstly, we introduces the background and current situation of this study, and puts forward the problems to be studied; Secondly, it designs a questionnaire to collect data by cluster sampling and questionnaire survey, and makes data cleaning; the description analysis of the data to study the club customer's characteristic, service condition and fitness condition consist the third part; The fourth part establishes structural equation model to study customer satisfaction model and its influencing factors. The results of the model analysis are interpreted as suggestions and solutions to improve the existing problems of the fitness club A be write in the fifth part.

2. Data Collection and Sorting

As a third-tier city in China, L City has a population of more than 7 million, including nearly 3 million urban population, and 134 health clubs (as of December 31, 2017). Fitness club A, the largest health club in the city, has 20 directly operated professional health clubs since its founding in 2006, after more than 10 years of development. These clubs have a combined business area of more than 40,000 square meters and more than 130,000 service members.

To gain a deeper understanding of the satisfaction and influencing factors of members of fitness club A, the customer satisfaction model is first established from seven dimensions, including customer expectation, customer complaint and customer loyalty, and the specific form of each hidden variable and its corresponding explicit variable is deeply analyzed. Secondly, add the basic information of the respondents, such as age, gender, fitness consumption, etc. Considering the convenience, comprehensibility and effectiveness of filling in the questionnaire, a total of 21 questions constitute the questionnaire. In order to guarantee the language used for them is accurate, scientific, and widely understood, the questionnaire's questions are chosen after talking with relevant professionals,

academics, and club management. In addition to the basic information of club members, other questions are used the Linker scale of 10 points.

Considering the advantages and disadvantages of different sampling methods and survey methods, and comparing them to the actual requirements of this survey project. This survey used the membership information database of fitness club A to construct a sampling frame and used computer generated random numbers to generate random samples.

3. Basic Information of Fitness Personnel

3.1 Basic Information of Respondents

Female members accounted for 55.93% of the total number of respondents; males accounted for 44.07% of the population, with a sex ratio of 78.8, much lower than the national sex ratio of 117 (Note 3). The proportion of women participating in fitness is greater than that of men. On the one hand, the club should greatly improve the satisfaction of female members and increase the consumption time of members; on the other hand, clubs need to expand the market for men to participate in fitness and attract more members to join.

Among the occupations of the respondents, the number of professional white-collar workers is the largest, accounting for about 30% of the total, reaching 32.2%; private enterprise managers ranked second, accounting for 20.34% of the total; administrative and government personnel and senior managers of state-owned enterprises ranked third and fourth respectively, accounting for 15.82% and 11.86% of the total. The proportion of other personnel, including technicians, operators, service personnel, etc. is relatively low. Fitness club A should focus on studying the market demand of professional white-collar workers, enterprise managers and government personnel, improve operation and launch commercial activities.

In terms of income distribution, a significant portion of the surveyed population falls into various income brackets. Specifically, 7.91% of respondents have a monthly income below 2000 yuan, while 20.90% fall into the bracket of 2000-4000 yuan. A larger proportion, 35.59%, represents individuals earning 4000-6000 yuan per month. Furthermore, 23.16% of respondents reported a monthly income of 6000-8000 yuan, and 12.43% indicated earning more than 8000 yuan per month. Consequently, it can be inferred that Compared with the average annual salary of urban non-private unit employees in L City in 2017, 56,560 yuan, the members of fitness club A belong to a relatively high income group.

3.2 Analysis of Respondents' Purchase Intention

In the survey evaluating the cost performance of fitness consumption at fitness club A, findings indicate that the majority of respondents, accounting for 60.98%, regarded the club's cost performance as moderate. 32.93% of respondents expressed the opinion that the price of the fitness card was high, resulting in a relatively lower cost performance. 6.09 per cent of respondents thought the club was good

value for money. The service of fitness club A was recognized by more than 60% of the respondents, which fully shows that the work of fitness club A has been well received by customers.

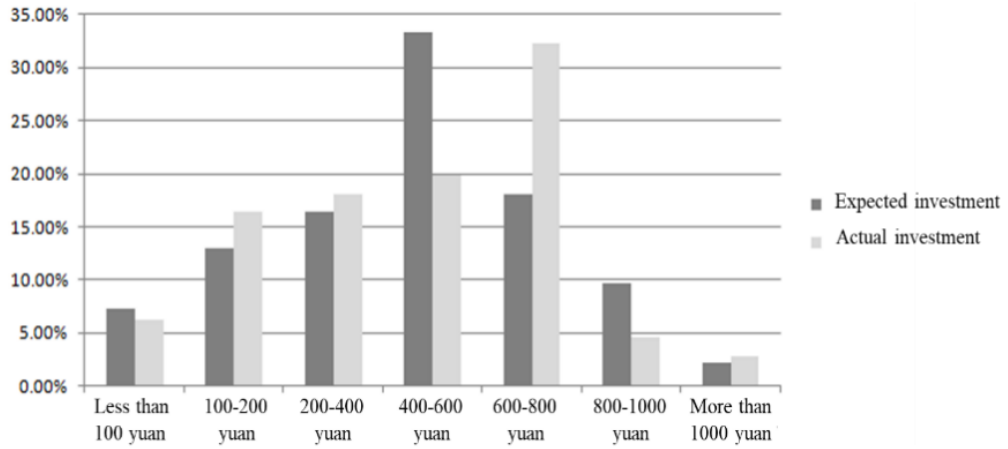

Figure 1. Comparison between Expected and Actual Investment in Fitness

As shown in Figure 1, the expected investment in fitness consumption by members of fitness club A shows a symmetrical distribution of "large in the middle and small at both ends", which is mainly concentrated in the range of 400-600 yuan per month, reaching 33.33% of the total number of respondents. 63.27% of the people expect to invest more than 400 yuan per month; 67.79% of the people expect to spend 200-800 yuan per month. There is a large difference between the actual and expected investment of club members in fitness consumption, showing an asymmetric distribution of high on the left and low on the right, mainly concentrated in the range of 600-800 yuan per month, reaching 32.21% of the total number of respondents. The actual monthly investment of 400 yuan or more accounted for 59.38% of the total; the actual monthly investment of 200-800 yuan accounted for 70.02% of the total number of people. From Figure 1 and the comparative analysis above, the expected and actual investment in fitness consumption by members of fitness club A is basically consistent and the staff ratio is basically the same, even in the range of 200-800 yuan. However, there is a large difference between 400-600 yuan and 600-800 yuan, and the members' expected investment in 400-600 yuan is 13.55% higher than the actual investment in the area, and the members' expected investment in 400-600 yuan is 14.13% lower than the actual investment in the area.

Therefore, fitness club A should improve the consistency of members' expected input and actual input from two aspects. On the one hand, change the existing fee model, set the price of fitness card at a more appropriate price, reduce the number of members who invest 600-800 yuan per month, increase the number of members who invest 400-600 yuan per month, and increase the number of people who charge 800-1000 yuan per month. On the other hand, guiding members' consumption expectations can

be carried out by changing the service model, service environment, and service methods. Such as medical, beauty, skin care, physiotherapy, yoga, fighting and other services to stimulate the consumer demand of members.

3.3 Analysis of Reasons for Purchase of Respondents

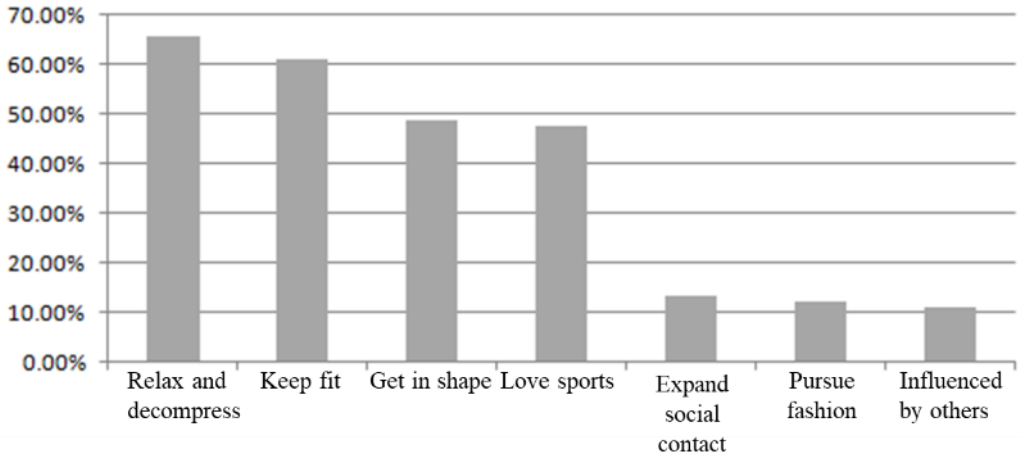

Figure 2. Fitness Reasons Bar Chart

First, analyze why respondents participate in fitness exercises. Considering that there are many reasons that affect fitness, this question is set as a multiple choice question. The summary results are shown in Figure 2. 65.85% of members who choose “relaxation and decompression” occupy the highest proportion; The second is “physical fitness”, accounting for 60.98%; Again, “shape and beauty” and “love sports”, accounting for 48.78% and 47.56% respectively. The proportion of other reasons is relatively low. It can be seen that the main reason for respondents to participate in fitness is to keep fit and enjoy their body and mind rather than to pursue fashion or be influenced by others. Consumers seem more rational in making their purchase decisions.

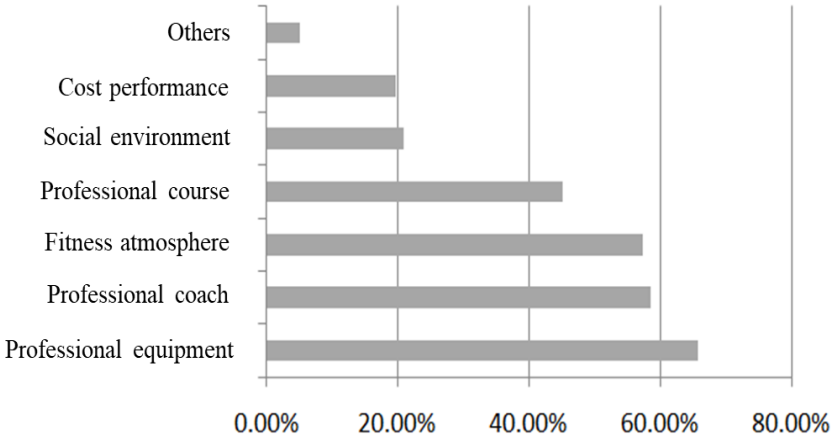

Figure 3. Gym Exercise Reasons Bar Chart

Secondly, analyze the reasons why the respondents participate in gym exercise. This question is also a multiple choice question and the results are summarized as Figure 3. The main reasons for most people to choose gyms for exercise are “professional equipment”, “relaxed fitness environment”, “professional guidance” and “professional fitness courses”, accounting for 65.85%, 58.54%, 57.32% and 45.12% of the respondents respectively. Other reasons “opportunities to make friends”, “reasonable price, cost-effective” and “other” accounted for a relatively low proportion, all less than 20%. It can be seen that people choose to go to the gym to keep fit is basically because the gym is more professional, can give scientific guidance, make a reasonable fitness plan, and has a good fitness environment; Respondents demonstrated a lesser emphasis on price and socializing factors while placing greater importance on the professionalism of the gym and the conducive atmosphere for relaxed fitness.

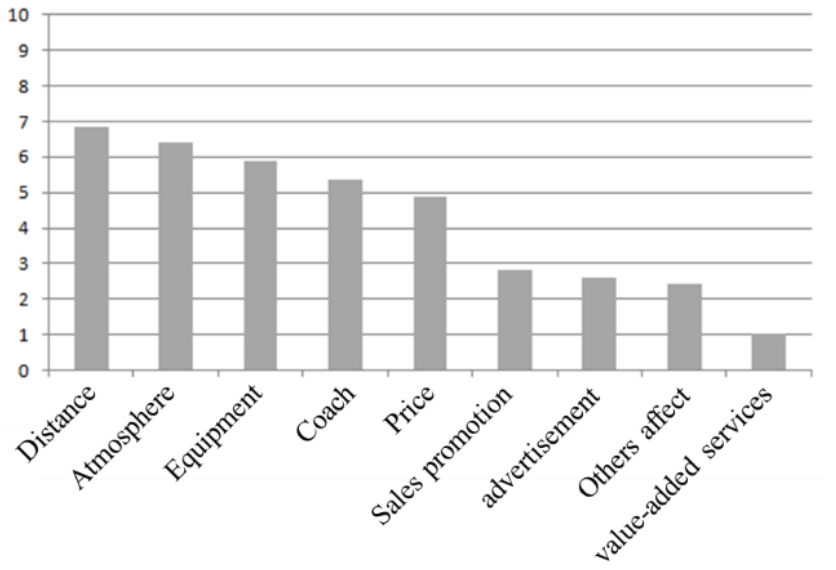

Figure 4. Factors Influencing the Choice of Gym

Finally, analyze the influencing factors of choosing fitness club A. The Lee Carter Scale was used to measure various factors in choosing a gym and the results were summarized as Figure 4. The score of "geographical proximity" was the highest, with 6.83 points. The second most important factor was "fitness environment and atmosphere", with a score of 6.39. Secondly, because of the "variety of equipment and facilities in the gym" and "good coach service" and "reasonable price of fitness card", the scores were 5.88 and 5.34 points and 4.88 points respectively. The scores of "promotional activities", "attraction of gym advertising", "recommendation by family and friends" and "value added activities" (free Internet access, drinking water, dining bar) are all below 3 points, and the impact is small. In this sense, most members are relatively rational consumers, choosing a club is mainly about position, environment, equipment, coaches and other factors can reflect the professionalism of the club, but for advertising, promotion, other people's influence and other market factors are not too important.

4. Satisfaction Analysis Based on Structural Equation Model

According to the theory of structural equation model, the external relationship in the model refers to the relationship between the observed explicit variable and the latent variable. The measurement equation is divided into two types: the reflection equation and the constitutive equation. The former assumes that the observed phenomenon is the reflection of the latent variable and the latter indicates that the explicit variable is the compound factor that forms the latent variable. Considering the inherent limitations of questionnaires, it is important to note that not all aspects can be comprehensively covered within the survey. As a result, the measurement equation serves as a practical application of a reflective model,

wherein the selected questions (explicit variables) possess a strong capacity to characterize the latent variable. Therefore, this paper uses the reflection formula to analyze the customer satisfaction of fitness club A.

Smartpls3.2.6 software was used for modeling to build the cause-and-effect path diagram model as shown in Figure 5. Set the Subsample to 500 and then run it through Bootstrapping to obtain the significant value of each path, that is the T value. The running results are shown in Figure 5. The T value between the latent variable and its corresponding explicit variable is greater than 1.96 and the path coefficient is significant, indicating that the explicit variable in the model can explain the latent variable well. However, four of the path coefficients between latent variables are not significant, so they need to be corrected.

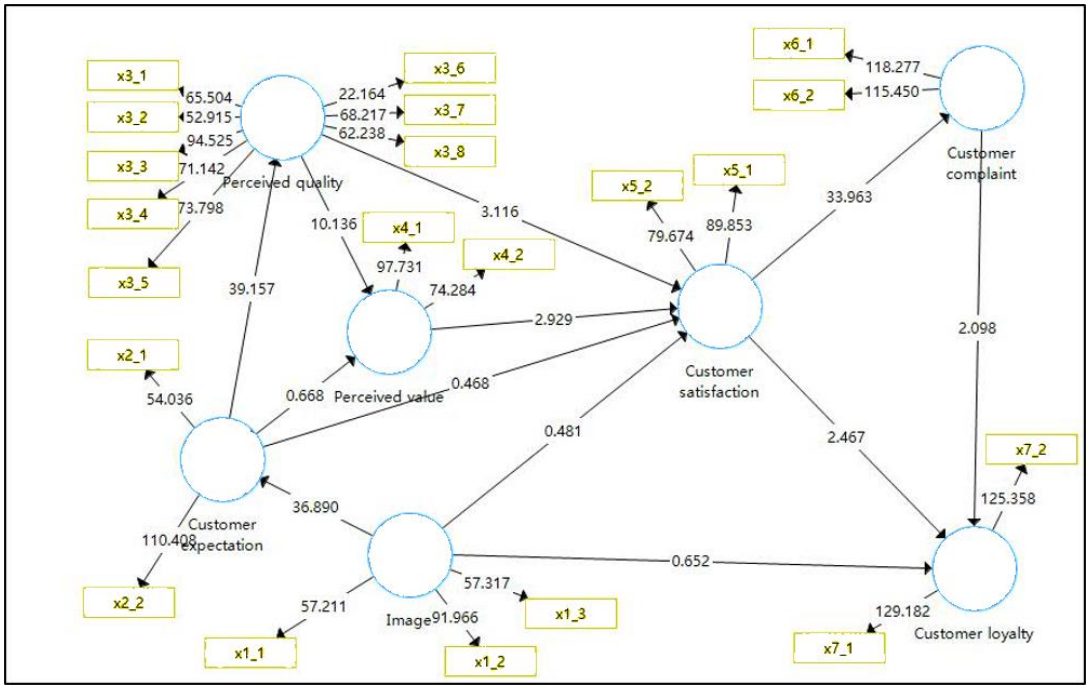

Figure 5. Structural Equation Model and Calculation Results

Since there is no correction index set in SmartPLS software, this paper will only correct the path significance as the goal. After correction, the results are shown in Figure 6.

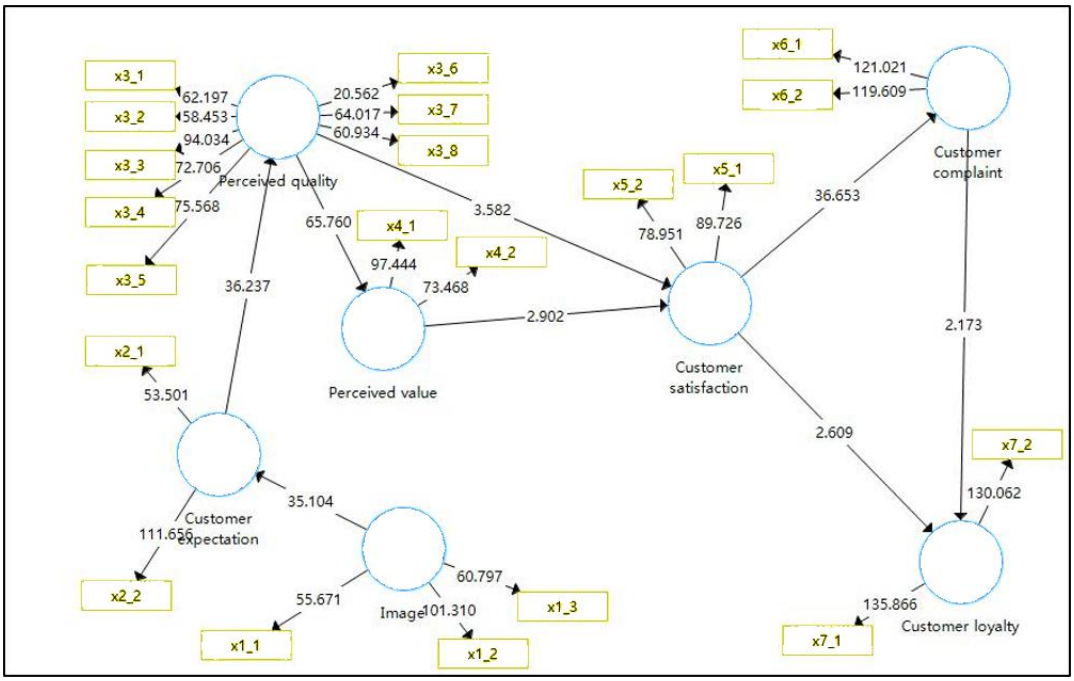

Figure 6. Modified Operation Results

It can be seen from Figure 6 that at this time, all paths are significant, all indicators are within the normal range, and the model interpretation degree Square does not decrease, indicating that the correction is appropriate.

4.1 Reliability Test

The reliability of questionnaires refers to the consistency and reliability of questionnaires. It is necessary to conduct comprehensive analysis and judgment on the answers of numerous questionnaires. By analyzing the responses from multiple questionnaires regarding identical questions, it becomes possible to assess the consistency of the answers and evaluate their reliability. For the same question, the smaller the fluctuation of the answers of multiple questionnaires, the better the consistency and the higher the reliability. After the causal relationship path map was set, the data were calculated and Cronbach's Alpha was used to test the consistency of latent variables' internal reliability. Cronbach's Alpha is the most commonly used reliability index for customer attitude and behavior research at present and Cronbach's Alpha>0.7 was considered as high reliability. The calculated Cronbach's Alpha values of the built model are all greater than 0.7, indicating a good consistency within the scale, which can be studied and analyzed. The results are shown in Table 1:

Table 1. Results of Internal Consistency Test

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P-Values
Customer complaint	0.946	0.945	0.018	53.716	0.000
Customer expectation	0.893	0.889	0.030	29.844	0.000
Customer loyalty	0.951	0.950	0.016	59.809	0.000
Customer satisfaction	0.929	0.926	0.026	35.731	0.000
Brand image	0.951	0.950	0.014	69.758	0.000
Perceived quality	0.981	0.981	0.005	217.676	0.000
Perceived value	0.921	0.919	0.026	35.585	0.000

4.2 Validity Test

The validity referred to in this paper refers to the extent to which a set of measurement scales can truly measure the predicted psychological and behavioral outcomes of fitness club A members, also is the extent to which close to the real measurement. According to the characteristics of questionnaire, this paper decided to evaluate the validity of the scale from the convergent validation CV. The evaluation method has Composite Reliability CR. The higher the CR value, the stronger the correlation among the group of items and the greater consistency in measuring underlying factors, thereby indicating a superior CV. In general, CR often needs to be greater than 0.6.

Table 2. Combined Reliability (CR)

	Original Sample(O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P-Values
Customer complaint	0.974	0.973	0.008	117.129	0.000
Customer expectation	0.949	0.947	0.014	69.797	0.000

Customer loyalty	0.976	0.976	0.008	129.641	0.000
Customer satisfaction	0.966	0.965	0.012	80.831	0.000
Brand image	0.968	0.968	0.008	114.620	0.000
Perceived quality	0.984	0.984	0.004	262.508	0.000
Perceived value	0.962	0.961	0.012	80.988	0.000

It can be seen from Table 2 that the combined reliability of each potential variable is greater than 0.6, the highest is 0.984 and the lowest is 0.949, indicating that the scale has good validity.

4.3 Model Fitting Evaluation

The fitting evaluation of the model can be divided into two types: subjective evaluation and objective evaluation. Subjective evaluation is mainly to evaluate whether the established model conforms to the pre-theoretical assumptions, that is, to check the relationship between variables, especially whether the relationship between latent variables is reasonable and to check whether the size of each path coefficient in the estimated model and the positive and negative signs are normal. Objective evaluation is mainly to evaluate and judge the relevant data indicators calculated by the model and determine whether the model meets the general standards according to the size or symbol of the indicators.

External model evaluation. External model of evaluation index of reference is Average Variance Extracted(AVE). It is used to measure the latent variables of caused by measurement error obtained from the observation of variables to explain the total variance. AVE can be used to evaluate the merits and demerits of the model, that is the reliability of latent variables and the validity of the conceptual discriminant. Generally, AVE values greater than 0.5 are required to indicate that more than 50% of the variance information of the observed variables is utilized. At the same time, as a tool to evaluate the differentiation degree, the AVE value of the latent variable should be greater than the square of the correlation coefficient of the latent variable, indicating that the variance between the latent variable and its corresponding observed variable is greater than the variance between other observed variables and the structural variable. The higher the AVE value, the better the effect. According to the calculation, the AVE value of each latent variable is greater than 0.5. The highest is 0.953 and the lowest is 0.884, indicating that the external estimation relationship of the whole model is very good.

Evaluation of internal models. The evaluation of the internal model is mainly measured by the sample determination coefficient R Square. As an index of cross-checking consistency, the sample determination coefficient can be used to evaluate the explanatory ability of the structural model. The larger the value, the better. The calculated R Square of each latent variable is greater than 0.81,

indicating that the internal interpretation function of the model is good.

In short, from the subjective analysis, each data basically conforms to the pre-assumption and the actual situation; from the objective analysis, the model fitting index conforms to the evaluation criteria. Therefore, it is concluded that the fitting effect of the whole model is good and the model structure is reasonable in the acceptable category.

5. Conclusions and Recommendations

5.1 Model Analysis Conclusion

According to the results of observation data analysis, the correlation coefficient between perceived quality and customer satisfaction is 0.530, which indicates that quality can directly affect customer satisfaction. Only by fully improving the quality of health club products and services for consumers can we improve customer satisfaction faster. Perceived value also has a certain correlation with customer satisfaction. The correlation coefficient is 0.440 but it is weaker than perceived quality. The path coefficient of perceived quality and perceived value is 0.949. It shows that only by effectively improving its own strength and making consumers feel value for money can the club make customers willing to consume in the club, thereby improving its competitiveness and enhancing customer loyalty. The path coefficient of customer satisfaction and customer complaint is 0.933. It indicates that the timely solution of customer complaints is conducive to improving customer satisfaction. The correlation coefficient between perceived quality and customer expectation reached 0.911. It shows that customers had a full understanding of the health club before consumption. So the expectations formed on products and services had a strong convergence with the actual quality perception after experience and did not form too high expectations. The path coefficient between brand image and customer expectation is 0.909. It suggests that customers have high expectations for a good brand image and believe that it should meet their various needs. The correlation coefficient between customer complaints and customer loyalty is 0.449. Loyal customers may be generated because the club has a good complaint resolution mechanism. However, compared with the correlation coefficient of 0.535 for customer satisfaction, customer complaint is not the most important reason to determine customer loyalty.

The correlation coefficients of perceived quality were all above 0.9 in the general service level of clubs, fitness facilities, fitness environment, supporting measures (parking, bathing), service attitude of staff, professional degree of coaches and scientific fitness courses. The path coefficients for the explicit variables such as perceived value annual fee price and service quality are 0.964 and 0.961, respectively. The score of the explicit variable representing customer satisfaction is consistent with the expectation indicating that the customer’s satisfaction with the existing service has reached the satisfaction with the expected service.

5.2 Suggestions

Establish a perfect service quality management system. All kinds of problems in the service process are unavoidable for service enterprises such as health clubs. Therefore, it is important to establish a perfect management system. First, establish the right service process and standards. Service is embodied by service personnel, so service managers should transform their understanding of customer expectations into service quality norms that staff can understand and implement. Specific ways are as follows: Firstly, set communication and strengthen customer expectation-oriented service standards for health club service staff; Secondly, set up both challenging and realistic detailed service quality objectives to meet customer expectations; Thirdly, the importance of different tasks should be fully understood by the service staff so that they can distinguish the priorities and know which tasks should be prioritized. Fourthly, the performance of staff should be evaluated regularly and the rewards and punishments should be clearly defined. Then, make sure the service is up to standard. When the fitness club has established corresponding service standards based on customer expectations but employees cannot achieve the corresponding service standards, there is a gap between service standards and service delivery. Therefore, the service standard must be supported by matching resources and it needs long-term adaptation and improvement until it goes deep into the heart of every service provider.

The specific solutions are as follows: First, let each service personnel understand their role so that they can be clear about their responsibilities and obligations; second, improve recruitment methods to select staff with true service spirit and corresponding service ability; third, a fair, open and just reward and punishment system should be designed to encourage all employees to do their jobs well; fourth, with a group of excellent personal coaches to provide customized services and meet the diverse needs of customers; fifth, give service personnel and fitness coach a certain freedom appropriately to make decisions to better meet the needs of customers; Sixth, brainstorm and let all service personnel participate in the customization of service processes and standards.

Optimize the environment and facilities of the health club. According to the survey results, the environmental facilities of the fitness club A have a strong correlation with the perceived quality. For customers, the health club is not only a fitness place but also a place for their leisure and relaxation, which makes the club not only focus on fitness but also make a difference in service details. Therefore, if a health club wants to establish itself and get a good development, it needs to be constantly updated in terms of machinery and equipment, decoration style and so on. This will not only help to create a more comfortable fitness environment and more humane service for customers but also improve the reputation and popularity of health clubs. The decoration of the club should give people a beautiful, generous and natural feeling. At the same time, the store decoration should ensure that the style is consistent and constantly add the latest elements to the environmental decoration of the club. Due to the fitness venue is the direct place where customers receive services, it has a strong impact on the

perceived quality of customers. Therefore, the layout of the health club should be scientific and reasonable. It not only to ensure that the fitness space is bright and spacious but also to have a comfortable ground. In addition, the high-quality leisure bars, bathrooms, sanitation and other supporting facilities are also necessary.

Deal with club complaints timely and effectively. Members' complaints may involve all aspects of the health club such as the environment, the service of service personnel or the quality of sports equipment and even the water temperature when taking a bath. In order to ensure that each department of the health club can maintain consistency and cooperate when responding to complaints rather than blaming each other, the health club should establish a sound management system for handling member complaints: (1) standard and strict rules and regulations; (2) complaints are classified into different levels from light to serious and handled by managers at different levels; (3) to deal with problems, it is strictly forbidden to pass the buck to each other, but to unite as one, and treat and deal with problems in a correct attitude; (4) detailed record contents, handling, processing speed and so on. Because, for the club, the complaint opinion is not only a constraint on the development but is a valuable information resource. As long as the complaints are handled correctly and the information useful to the club is dug out, the complaints of members can be converted into a source of motivation for the sustainable development of the health club. Accurate and detailed collection of member complaint information have many advantages. First, it can generally grasp which complaints can not be timely, quick resolution and need to be followed up. The second is to be able to clearly understand the shortcomings of the club from the perspective of "God". On this basis, you can make up for and correct your own shortcomings. The above analysis results show that customer complaints have a strong impact on loyalty. If the customer complaints can be quickly and satisfactorily resolved, then the customer's satisfaction with the club will be greatly improved and they will even unconsciously do publicity work for the health club. These "positive energy" publicity is very helpful for health clubs to establish a positive image in the society that puts customers' interests first and genuinely cares for customers. Therefore, the effective handling of complaints has a good role in promoting the club's foothold and development.

References

Awad, N. H. H. A., Zabady, H. A. H., Elbialy, G. G., & Ashour, H. M. A. A. (2024). Entrepreneurial leadership, nurses' proactive work behavior, and career adaptability: A structural equation model. *BMC Nursing*, *23*(1). Retrieved from http://dx.chinadoi.cn/10.1186/s12912-024-01804-4

Bing, L. (2010). Evaluation of Influencing Factors of Community Sports Clubs in Shanghai Based on SEM. *Journal of Shanghai Institute of Physical Education*, *34*(05), 22-26+67. https://doi.org/10.16099/j.cnki.jsus.2010.05.019

Bohong, L. (2008). A Comparative Study on the Competitiveness of Fitness Clubs across the Taiwan Strait: Taking Beijing and Taipei as Examples. *Journal of Beijing Sport University*, (08), 1055-1060+1066. https://doi.org/10.19582/j.cnki.11-3785/g8.2008.08.014

Calaguas, N. P., & Consunji, P. M. P. (2022). A structural equation model predicting adults' online learning self-efficacy. *Education and Information Technologies*, *27*(5), 6233-6249.

Celina, G., Pedro, M., & J. M, C. (2016). Consumer Behaviour in Fitness Club: Study of the Weekly Frequency of Use, Expectations, Satisfaction and Retention. *The Open Sports Sciences Journal*, *9*(1), 62-70. https://doi.org/10.2174/1875399x01609010062

Chun, S.-P., Hwang, Y. S., et al. (2014). An Effect on Customer Satisfaction, Re-Registration, and Recommendation Intention of Fitness Club Customers' Participation Intention. *Korean Journal of Sports Science*, *23*(3), 505-515.

Customer Satisfaction Evaluation (2001). Shanghai Science and Technology Press.

Dabija, C. D., Csorba, M. L., Pop, H. N., et al. (2023). The Impact of Extraversion and Introversion on Millennials Propensity to Recommend Their Preferred Fitness Center. *Behavioral Sciences*, *14*(1). https://doi.org/10.3390/BS14010022

Dang, V. T., Nguyen, H. V., Hoang, T. H., et al. (2022). Gyms' indoor environmental quality and customer emotion: The mediating roles of perceived service quality and perceived psychological safety. *Leisure Studies*, *41*(2), 263-280.

Eftekhari, N., Kwasny, L., & Akhavian, R. (2024). Assessing Trust in Construction AI-Powered Collaborative Robots Using Structural Equation Modeling. *Journal of Computing in Civil Engineering*, *38*(3). https://doi.org/10.1061/JCCEE5.CPENG-5660

Gaofu, L., & Lei, N. (2011). An Empirical Study on the Impact of Fitness Club Brand Image on Customer Loyalty. *Journal of Beijing Sport University*, *34*(10), 20-23. https://doi.org/10.19582/j.cnki.11-3785/g8.2011.10.006

Haozheng, L., & Bifang, L. (2009). *Principles and Applications of Structural Equation Modeling*. China Light Industry Press.

Islam, M. S. M., & Mohammadzadeh, M. (2014). A Survey on Customer Satisfaction across Physical Fitness Clubs in Districts 1-6 of Tehran from Quality of Services Provided for Them Based on Age, Gender and Education Status of Customers. *Kuwait Chapter of Arabian Journal of Business and Management Review*, *3*(9).

Jahangir, M. A., & Muhammad, M. (2023). Impact of service quality on user satisfaction in public university libraries of Bangladesh using structural equation modeling. *Performance Measurement and Metrics*, *24*(1), 12-30. https://doi.org/10.1108/PMM-06-2021-0033

Jianhua, Z., Rong, G., & Meng, X. (2006). A Survey and Research on the Female Sports Consumption Group of Fitness Clubs in Beijing. *Journal of Shenyang Institute of Physical Education*, (06), 4-6.

Jiao, W. (2016). *Research on Audit Quality Evaluation Based on Structural Equation Modeling* [Master's thesis, Harbin Institute of Technology].

Jingjing, M. (2021). *A Study on Member Satisfaction Evaluation of DDD Comprehensive Fighting Fitness Club* [Master's thesis, Lanzhou University of Technology]. https://doi.org/10.27206/d.cnki.ggsgu.2020.001356

Ke, L. (2022). *A Study on Customer Satisfaction of Tianjin Wedgwood Fitness Club Based on IPA Model* [Master's thesis, Tianjin Institute of Physical Education]. https://doi.org/10.27364/d.cnki.gttyy.2021.000029

Kim, Y.-I., & Jeong, Y. H., et al. (2012). The Effect of Physical Environment of Fitness Club on Customer Satisfaction and Loyalty. *Korean Journal of Sports Science*, *21*(2), 715-728.

Kun, Y. (2010). *A Study on Customer Satisfaction of Tianjin Fitness Club Based on PLS Structural Equation Model* [Master's thesis, Tianjin Normal University].

Lee, L. W., Shen, Z., Maroulis, K., et al. (2022). Using Ant Colony Optimization for Sensitivity Analysis in Structural Equation Modeling. *Structural Equation Modeling: A Multidisciplinary Journal*, *29*(1), 47-56. https://doi.org/10.1080/10705511.2021.1881786

Lim, J., Romsa, B., & Armentrout, S. (2016). The Impact of Perceived Value, Satisfaction, Service Quality on Customer Loyalty in Women's Fitness Clubs. *Health and Nutritional Sciences Faculty Publications*, *139*. https://openprairie.sdstate.edu/hns_pubs/139

Lu, J., Maruthaveeran, S., & Shahidan, M. F. (2025). Exploring the Motivational Pathways to Subjective Well-Being in Urban Forest Parks of Fuzhou, China: A Structural Equation Modelling Analysis. *Land*, *14*(9), 1799. https://doi.org/10.3390/land14091799

Minglong, W. (2009). *Structural Equation Model*. Chongqing University Press.

Mitsunaga, H., Hoshino, T., Shigemasu, K., et al. (2005). Parameter Estimation of Structural Equation Models Using Latent Variable Scores. *Japanese Journal of Behaviormetrics*, *32*(1), 21-33. https://doi.org/10.2333/jbhmk.32.21

Ng, K. S. P., Feng, Y., Lai, I. K. W., et al. (2024). How customer knowledge management helps retain fitness club members: A mediating effect of relationship quality. *International Journal of Sports Marketing and Sponsorship*, *25*(2), 360-381.

Ouyang, L., & Mak, J. (2025). Examining how switching barriers moderate the link between customer satisfaction and repurchase intention in the health and fitness club sector. *Asia Pacific Journal of Marketing and Logistics*, *37*(1), 115-135. https://doi.org/10.1108/APJML-01-2024-0010

Parasuraman, A. (1988). SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality. *Journal of Retailing*, *64*(1), 12-40.

Qiang, Z., & Xiangkun, L. (2011). An Empirical Study on the Impact of Perceived Service Quality on Utilization Satisfaction and Behavioral Intention among Fitness Club Users. *Journal of Wuhan*

Institute of Physical Education, *45*(06), 45-51. https://doi.org/10.15930/j.cnki.wtxb.2011.06.009

Shujie, Y. (2021). *A Study on Customer Satisfaction of Fitness Clubs in Wuhan City* [Master's thesis, Central China Normal University]. https://doi.org/10.27159/d.cnki.ghzsu.2021.004651

Shuhong, X. (2005). The Value Chain Management Status and Implementation Strategies of Chinese Sports and Fitness Clubs. *Journal of Beijing Sport University*, (04), 440-442. https://doi.org/10.19582/j.cnki.11-3785/g8.2005.04.003

Singh, Y. R., Rajesh, S., Rohan, M., et al. (2023). Two Phase Adaptive Cluster Sampling under Transformed Population Approach. *Lobachevskii Journal of Mathematics*, *44*(9), 3789-3805. https://doi.org/10.1134/S1995080223090317

Tripoltsioti, A., & Athanasopoulou, P. (2007). The relationship between customer satisfaction and the demographic profile of participants in the exercise programs of health and fitness clubs for municipal youth and sport organizations. *Choregia*, *3*(1), 59-66.

Xiaoqun, H. (2011). *Multivariate Statistical Analysis*. Renmin University of China Press.

Xu, K. K., Chen, K. K., Kim, E., et al. (2021). Dimensions of service quality in health-fitness clubs in China. *International Journal of Environmental Research and Public Health*, *18*(20), 10567. https://doi.org/10.3390/ijerph182010567

Yinghong, C. (2022). Research on Improving Service Satisfaction of Fitness Club Based on Peak-End Rule. In *Proceedings of the 2022 International Conference on Business Management, Humanities and Education* (pp. 123-130). Atlantis Press. https://doi.org/10.2991/978-94-6463-024-4_23

Yue, W., Guofu, Y., Biao, W., et al. (2024). Analysis of Factors Influencing Plant Diversity in Urban Wetlands Based on a Structural Equation Model. *Wetlands*, *44*(3). https://doi.org/10.1007/S13157-024-01784-W

Zequan, Y. (2023). *A Study on the Relationship between Customer Satisfaction and Influencing Factors of Commercial Fitness Clubs in Wuxing District, Huzhou City* [Master's thesis, Hangzhou Normal University]. https://doi.org/10.27076/d.cnki.ghzsc.2023.000899

Notes

Note 1. http://www.chyxx.com/industry/201706/531390.html

Note 2. https://www.sohu.com/a/132539690_628738

Note 3. Main data bulletin of the sixth National Population Census 2010.