
Research Articles

Sustainable Development Model of University Sports Club Satisfaction in Sichuan Province, China

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Abstract

This study aimed to (1) investigate the current status of university sports club satisfaction and its sustainable development in Sichuan Province, China; (2) identify and analyze the factors influencing the sustainable development model; and (3) develop and validate the proposed model. A mixed-methods research design was employed in three stages. First, qualitative data were collected through structured interviews with 15 experts to identify key components of the sustainable development model. Second, quantitative data were obtained from 360 respondents through a questionnaire survey and analyzed using structural equation modeling (SEM), with the sample size determined according to the rule of 20 times the number of observed variables. Third, the qualitative and quantitative findings were integrated and evaluated through focus group discussions involving 10 experts, who assessed the model in terms of feasibility, usefulness, appropriateness, and accuracy.

The findings showed that the sustainable development of university sports club satisfaction in Sichuan Province is progressively improving, although further refinement of the system is required. Perceived service quality, service expectations, and perceived value significantly and positively influenced the model, while perceived value functioned as a mediating variable. The model demonstrated acceptable fit indices, and all proposed hypotheses were supported. Expert evaluations confirmed the consistency of the findings and the practical applicability of the model. These findings provide insights for improving the

sustainable development of university sports club satisfaction in China, particularly through enhancing service quality, managing service expectations, and strengthening perceived value.

Keywords: Sustainable Development Model, University Sports Club Satisfaction, Perceived Service Quality, Perceived Value, Service Expectations.

Introduction

The sustainable development of university sports clubs has become increasingly important as higher education institutions seek to promote physical activity, sports participation, student well-being, and broader sports consumption. China's 14th Five-Year Plan for Sports Development emphasizes improving sports services and expanding participation, providing an important policy context for the development of university sports clubs (General Administration of Sport of China, 2021). However, despite progress in resource integration, curriculum development, and university–enterprise cooperation, university sports clubs continue to experience challenges related to service processes, coaching professionalism, facility resources, and responsiveness. These challenges may influence students' perceptions of service quality, perceived value, satisfaction, and continued participation (Huang et al., 2023; Zhao et al., 2023).

Service quality is widely recognized as an important determinant of customer satisfaction and behavioral outcomes. Grönroos (1984, 1988) emphasized that perceived service quality results from customers' evaluation of service performance and their experiences of the service process. Similarly, the SERVQUAL framework provides a systematic approach for assessing perceived service quality and has been applied in educational, healthcare, tourism, and other service contexts (Che et al., 2023). In university sports clubs, service quality may include the professionalism of coaches, reliability and responsiveness of services, facility conditions, and the quality of interactions between students and service providers. Previous studies have demonstrated relationships between sports club service quality, customer satisfaction, service value, and participation behavior (Chen, 2020; Huang & Wang, 2021; Zhao et al., 2023).

In addition to service quality, service expectations and perceived value are important factors in explaining satisfaction. Students evaluate sports club services not only according to actual service performance but also by comparing their experiences with prior expectations. Research has shown that expectations, perceived service quality, and satisfaction are closely associated in service settings (Liang, 2023). Perceived value can further influence satisfaction and behavioral intentions, while social interaction and emotional experiences may contribute to students' continued engagement (Chen & Xu, 2022; Wu & Huang, 2023; Zang et al., 2022). Studies of university sports clubs have also highlighted the importance of facility resources, functional value, and operational management in encouraging student participation (Huang et al., 2023; Zhao et al., 2023).

Nevertheless, several research gaps remain. Existing studies have largely examined individual factors such as service quality, perceived value, satisfaction, or participation, while relatively few have integrated these variables into a comprehensive sustainable development model for university sports clubs. Moreover, much of the existing research focuses on general or national contexts, with limited empirical evidence concerning specific regions. Research on university sports clubs in Sichuan Province remains particularly limited, and qualitative and quantitative evidence has not been sufficiently integrated to develop and validate a localized model.

Therefore, this study investigates the sustainable development of university sports clubs in Sichuan Province by examining the relationships among perceived service quality, service expectations, perceived value, and student satisfaction. Through systematic analysis and empirical validation, the study seeks to identify key factors affecting satisfaction and provide practical recommendations for improving service quality, management efficiency, student experience, and the sustainable development of university sports clubs in Sichuan Province.

Objective

1. investigate the current status of university sports club satisfaction and its sustainable development in Sichuan Province, China
2. identify and analyze the factors influencing the sustainable development model
3. develop and validate the proposed model.

Literature Review

The sustainable development of university sports clubs has received increasing attention as universities seek to improve student satisfaction, participation, physical health, and campus sports culture. In China, national and provincial sports policies have emphasized the development of sports services, consumption, facilities, and organizational mechanisms. The 14th Five-Year Plan for Sports Development highlights the importance of improving public sports services and promoting the development of the sports industry (General Administration of Sport of China, 2021). In Sichuan Province, the policy framework for constructing a “Sports Strong Province” has further incorporated university sports clubs into the broader sports governance system, emphasizing cooperation among universities, society, and market-oriented organizations. These policy developments provide an institutional foundation for examining the sustainable development of university sports clubs in Sichuan.

The theoretical foundation of this study is primarily based on customer satisfaction theory, service quality theory, and the American Customer Satisfaction Index (ACSI) model. Grönroos (1984, 1988) established service quality as an important determinant of customers’ perceptions and evaluations of services, distinguishing between technical and functional dimensions of service quality. SERVQUAL-based research further demonstrates the importance of reliability, responsiveness, assurance, empathy, and tangibles in evaluating perceived service quality (Che et al., 2023). In the context of higher education and university sports clubs, service quality and satisfaction are closely associated with students’ experiences and evaluations (Wang, 2021; Chen, 2020). Studies specifically examining university sports

clubs indicate that improving operational management, service value, emotional experience, facilities, and functional benefits can enhance student participation and satisfaction (Chen, 2020; Chen & Xu, 2022; Huang et al., 2023; Zhao et al., 2023).

Based on the literature, three major factors are identified as potentially influencing the sustainable development model of university sports club satisfaction: perceived service quality, service expectations, and perceived value. Perceived service quality reflects students' evaluations of the reliability, responsiveness, facilities, and overall delivery of club services (Grönroos, 1984, 1988; Che et al., 2023). Service expectations represent students' anticipated level of service before or during participation and may influence subsequent satisfaction evaluations (Liang, 2023; Zhou, 2024). Perceived value reflects students' assessment of the benefits received relative to the costs or resources invested. Previous studies suggest that perceived value is associated with satisfaction, loyalty, and continued participation (Wu, 2022; Wu & Huang, 2023; Zang et al., 2022).

The relationships among these variables provide the basis for developing the proposed sustainable development model. Existing research indicates that service quality can influence perceived value and satisfaction, while perceived value may mediate relationships between service-related factors and behavioral outcomes. Therefore, this study first investigates the current status of university sports club satisfaction and sustainable development in Sichuan Province, then identifies and analyzes the factors influencing sustainable development, particularly perceived service quality, service expectations, and perceived value. Finally, these relationships will be integrated into a conceptual model and empirically tested and validated among university sports club participants in Sichuan Province.

Conceptual framework

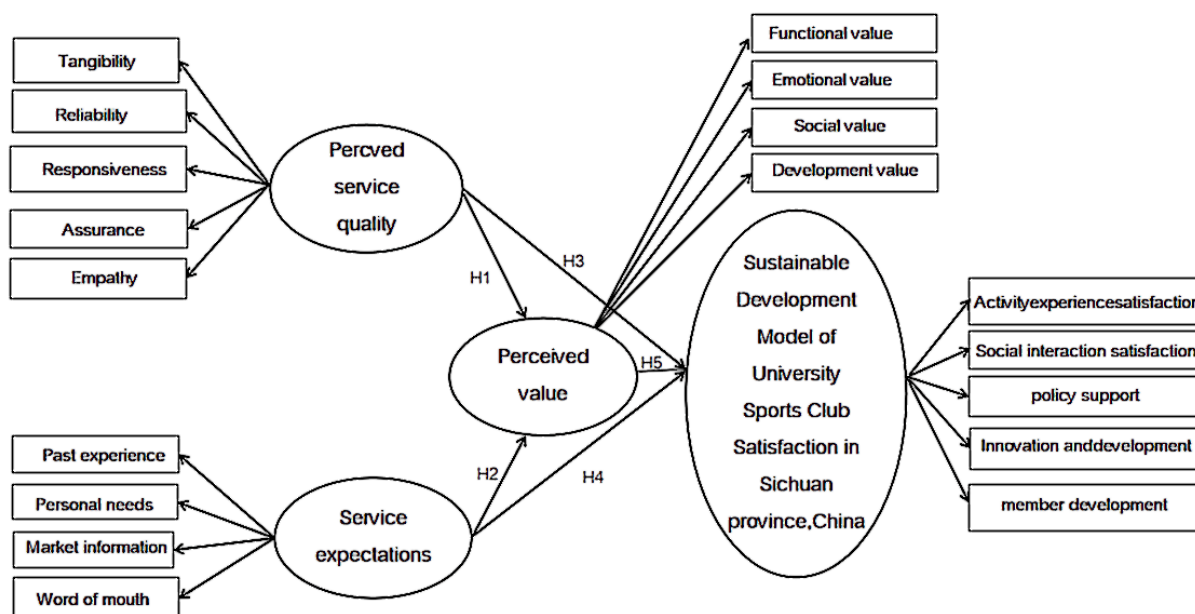


Figure 1 Conceptual model

This study examines the effects of perceived service quality and service expectations on university sports club satisfaction and sustainable development in Sichuan Province, China, with perceived value as a mediator.

H1: Perceived service quality significantly influences perceived value.

H2: Service expectations significantly influence perceived value.

H3: Perceived service quality significantly influences university sports club satisfaction and sustainable development.

H4: Service expectations significantly influence university sports club satisfaction and sustainable development.

H5: Perceived value significantly influences university sports club satisfaction and sustainable development.

H6: Perceived value mediates the relationship between perceived service quality and university sports club satisfaction and sustainable development.

H7: Perceived value mediates the relationship between service expectations and university sports club satisfaction and sustainable development.

Research Methodology

This study employed a mixed-methods research approach, combining qualitative and quantitative methods to investigate the factors influencing the Sustainable Development Model of University Sports Club Satisfaction in Sichuan Province, China. The methodology consisted of three main stages: qualitative investigation, quantitative analysis, and expert discussion. The combination of these methods provided a comprehensive understanding of the current situation and helped establish and validate the proposed research model.

Research Type and Study Population

The study adopted a mixed-methods research design. The qualitative component was used to explore the current situation, relevant factors, and perceptions concerning university sports club satisfaction and its sustainable development. The quantitative component was used to examine the relationships among the identified factors and to test the proposed hypotheses. The study population consisted of university students participating in or having experience with university sports clubs in Sichuan Province, China. In addition, relevant experts in university sports, physical education, sports management, and related fields were included in the qualitative stage.

Sample Groups and Selection Techniques

The study included three main sample groups. First, university students were selected as participants for the questionnaire survey. Second, selected university students and relevant stakeholders participated in structured interviews to provide information about the current situation of university sports clubs. Third, experts with relevant academic or professional experience were invited to participate in group discussions. Purposive sampling

was used for selecting interview participants and experts because they possessed relevant knowledge and experience. Appropriate sampling procedures were applied to recruit student participants for the quantitative survey.

Research Tools and Procedures

The research tools included a structured interview form, a questionnaire, and an expert discussion guide. In the first stage, a literature review was conducted to identify relevant concepts and potential factors. Structured interviews were then conducted to understand the current situation of university sports clubs and student satisfaction. In the second stage, a questionnaire was developed based on the literature review and findings from the qualitative investigation. The questionnaire was distributed to university students in Sichuan Province. In the third stage, group discussions were conducted with experts to examine, clarify, and confirm the factors identified from the previous stages.

Data Collection and Analysis

Data were collected through literature review, structured interviews, questionnaires, and expert group discussions. Qualitative data from interviews and discussions were organized and analyzed to identify major themes and relevant influencing factors. Quantitative questionnaire data were analyzed using AMOS 26.0 and appropriate statistical procedures. A structural equation model (SEM) was established to examine the relationships among the variables and to test the proposed seven hypotheses. The results from the qualitative and quantitative stages were then integrated to develop and validate the Sustainable Development Model of University Sports Club Satisfaction in Sichuan Province, China.

Results

Current Situation of SDM-USCSS

This study examines the Sustainable Development Model of University Sports Club Satisfaction in Sichuan Province, China (SDM-USCSS) using a mixed-method approach. The qualitative phase was based on literature reviews, relevant theories, field research, and expert-reviewed interview questions. Fifteen participants were selected for in-depth interviews to examine the current situation, implementation pathways, influencing factors, management standards, and evaluation indicators of SDM-USCSS. The findings also provide recommendations regarding budget management, fund use, and safety assurance to support the sustainable development of university sports clubs.

Factors Influencing SDM-USCSS

1. Basic Demographic Characteristics The study analyzed participants' characteristics based on gender, age, occupation, education, work nature, club participation frequency, monthly living expenses or income, and motivation for joining university sports clubs.

2. Questionnaire Descriptive Statistics The questionnaire measured four main variables: perceived service quality, service expectations, perceived value, and SDM-USCSS, covering 18 dimensions. The skewness and kurtosis values were below 2 and 7, respectively, indicating acceptable data normality.

3. Reliability Test Cronbach's alpha was used to assess the internal consistency of the questionnaire. The alpha coefficients for the 18 dimensions ranged from 0.844 to 0.940, indicating good reliability across all variables.

Table 1 Reliability testing of each variable

Variable	N	Cronbach's Alpha
Tangibility	4	0.879
Reliability	5	0.905
Responsiveness	5	0.881
Assurance	5	0.888
Empathy	5	0.926
Past Experience	5	0.909
Personal Needs	5	0.916
Market Information	4	0.855
Word of Mouth	4	0.87
Functional Value	5	0.935
Emotional Value	5	0.910
Social Value	5	0.918
Development Value	5	0.946
Activity Experience Satisfaction	5	0.920
Social Interaction Satisfaction	5	0.912
Policy Support	5	0.900
Innovation and Development	5	0.883
Member Development	5	0.920

4. Validity Analysis (Exploratory Factor Analysis) Exploratory factor analysis confirmed good construct validity of the scale. All variables met the criteria for factor analysis, with KMO values above 0.60 and significant Bartlett's tests ($p < 0.001$). The KMO values were 0.947 for Perceived Service Quality, 0.943 for Service Expectations, 0.941 for Perceived Value, and 0.958 for SDM-USCS. These results indicate adequate sampling adequacy and significant correlations among items, supporting the suitability of the data for factor analysis. Overall, the scale demonstrated good construct validity. Detailed statistics are presented in Table 2.

Table 2 KMO and Bartlett's tests for each variable

variable	KMO	Bartlett's Test of Sphericity		
		Approx. Chi-Square	df	sig
Perceived service quality	0.947	6016.816	276	$P < 0.001$
Service expectations	0.943	4741.864	153	$P < 0.001$
Perceived value	0.941	7305.512	190	$P < 0.001$
SDM-USCS	0.958	6910.688	300	$P < 0.001$

5. Validity Analysis (Confirmatory Factor Analysis) Confirmatory factor analysis (CFA) was conducted to assess construct validity, including model fit, convergent validity, and discriminant validity (1) Model fit. The fit indices for perceived service quality, service expectations, perceived value, and SDM-USCS generally met accepted criteria ($\chi^2/df < 5$, GFI, AGFI, IFI, TLI, and CFI > 0.90 , RMSEA < 0.08). The χ^2/df values ranged from 1.526 to 2.617, while RMSEA ranged from 0.038 to 0.067. Although the AGFI for perceived value was slightly below 0.90 (0.870), the overall results indicated good model fit (2) Convergent validity. All constructs met the recommended thresholds of CR > 0.70 and AVE > 0.50 . CR values ranged from 0.880 to 0.957, and AVE values ranged from 0.517 to 0.816, demonstrating satisfactory internal consistency and convergent validity (3) Discriminant validity. The square root of AVE for each dimension exceeded its correlations with other dimensions. The results indicate that the constructs were sufficiently distinct and demonstrated good discriminant validity.

6. Assessment of Structural Model A structural model was established, as shown in Figure 2, to examine the relationships among the variables. The results of the structural model analysis are presented below.

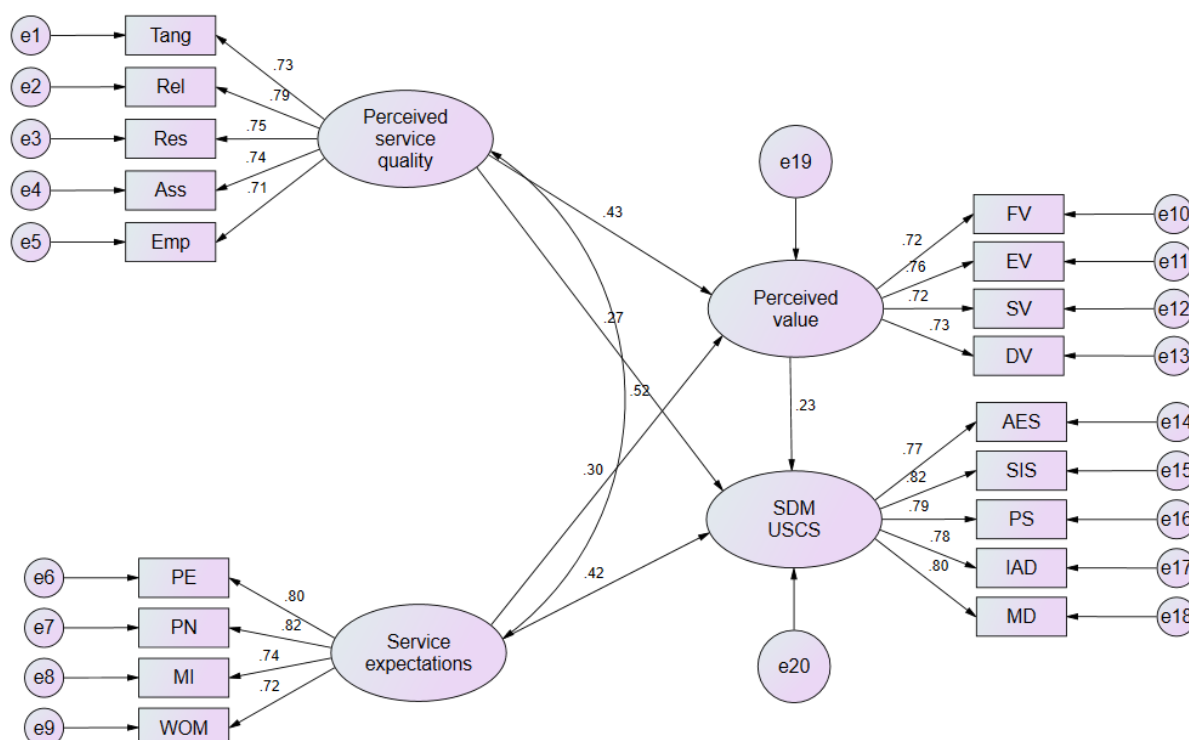


Figure 2 Schematic diagram of the structural model

1) Model fit indices for structural equation models. The model fit indices for the structural equation modeling results demonstrate satisfactory fit. Specifically, the χ^2/df ratio (1.738) is below the 5% threshold, meeting acceptable standards. Key fit indices including GFI (0.934), AGFI (0.913), IFI (0.972), TLI (0.967), and CFI (0.972) all exceed 0.9, indicating high model fit. The root means square error of measurement (RMSEA) of 0.045 falls within the ideal range of 0.08, suggesting effective residual control.

Table 3 Model fit indices for structural equation models

Index	c^2/df	GFI	AGFI	IFI	TLI	CFI	RMSEA
Reference value	<5	>0.9	>0.9	>0.9	>0.9	>0.9	<0.08
Actual measured value	1.738	0.934	0.913	0.972	0.967	0.972	0.045
	✓	✓	✓	✓	✓	✓	✓

2) Structural Equation Model Path Analysis Structural equation modeling and path analysis were used to estimate path coefficients and Critical Ratio (CR) values. A $CR \geq 1.96$ indicates statistical significance at the 0.05 level (Hou Jetai & Wen Zhonglin, 2005). As shown in Table 3, perceived service quality ($\beta = 0.432$, $P < 0.001$) and service expectations ($\beta = 0.295$, $P < 0.001$) significantly and positively influenced perceived value. Furthermore, perceived service quality ($\beta = 0.268$), service expectations ($\beta = 0.416$), and perceived value ($\beta = 0.231$) significantly positively influenced satisfaction ($P < 0.001$). The SMC values were 0.406 for perceived value and 0.587 for satisfaction, indicating that the model explained 40.6% and 58.7% of the variance, respectively.

Table 4 Path coefficients between variables in structural equation models

path			β	b	S.E.	C.R.	P	SMC
Perceived value	←	Perceived service quality	0.432	0.416	0.067	6.202	***	0.406
Perceived value	←	Service expectations	0.295	0.387	0.088	4.402	***	
SDM-USCS	←	Perceived service quality	0.268	0.284	0.066	4.300	***	0.587
SDM-USCS	←	Service expectations	0.416	0.598	0.089	6.690	***	
SDM-USCS	←	Perceived value	0.231	0.253	0.070	3.612	***	

Note: ***, $P < 0.001$; b: non-standardized coefficient; β : standardized factor coefficient

7. Mediated effects test Based on the results of the structural equation model path analysis, the hypothesis test was valid. In order to explore whether there was a mediating effect in these significant paths, we ran the Bootstrap method in AMOS 26.0, selecting 5,000 repetitions, a 95% confidence interval standard, and a bias correction method for testing.

Table 5 Results of the mediation effect test

Regression path	Effect type	Effect	SE	95% Lower	95% Upper	P
Perceived service quality→Perceived value→SDM-USCS	Indirect effects	0.100	0.032	0.044	0.171	0.000
	Direct effects	0.268	0.068	0.131	0.399	0.000
	Total effect	0.368	0.059	0.251	0.481	0.000
Service expectations→Perceived value→SDM-USCS	Indirect effects	0.068	0.027	0.027	0.138	0.000
	Direct effects	0.416	0.067	0.282	0.538	0.000
	Total effect	0.484	0.061	0.359	0.596	0.000

As shown in Table 5, the bootstrap mediation analysis confirmed significant indirect effects of perceived service quality and service expectation on the Sustainable Development Model of University Sports Clubs in Sichuan Province, China (SDM-USCS). Perceived service quality showed a significant indirect effect ($\beta = 0.100$, $SE = 0.032$, 95% CI [0.044, 0.171], $p < 0.001$), while its direct effect remained significant ($\beta = 0.268$, $p < 0.001$), indicating partial mediation. Similarly, service expectation demonstrated a significant indirect effect through perceived value ($\beta = 0.068$, $SE = 0.027$, 95% CI [0.027, 0.138], $p < 0.001$), with a significant direct effect ($\beta = 0.416$, $p < 0.001$), indicating partial mediation.

8. Results of Hypothesis Testing Reliability and validity analysis, structural equation modeling, and mediation analysis were conducted to test the proposed hypotheses. The results supported hypotheses H1–H7.

Examination and Confirmation of the Sustainable Development Model

A mixed-method approach, combining focus groups and questionnaires, was used to examine the feasibility, appropriateness, usefulness, and accuracy of the proposed model.

The focus group findings were consistent with the quantitative results and reached consensus on the key factors influencing the Sustainable Development Model of University Sports Club Satisfaction in Sichuan Province, China. These factors include perceived service quality, service expectations, and perceived value.

Discussion

The findings provide evidence for the three objectives of this study: investigating the current status of university sports club satisfaction and sustainable development in Sichuan Province, identifying factors influencing the sustainable development model, and developing and validating the Sustainable Development Model of University Sports Club Satisfaction (SDM-USCS). The results indicate that perceived service quality, service expectations, and perceived value significantly and positively influence the SDM-USCS. These findings suggest that sustainable development of university sports clubs depends not only on participation opportunities but also on students' evaluations of service experiences and the value they obtain from club activities.

Regarding the current status of satisfaction and sustainable development, university sports clubs benefit from factors such as venue facilities, standardized service processes, and professional coaching. These resources can contribute to positive service experiences and strengthen students' trust and satisfaction. Zhao et al. (2023) similarly demonstrated that service quality influences experience quality and subsequent behavioral intentions in sports tourism. Zhao, Wang, and Li (2023) further emphasized the importance of facility resources and functional value in college sports club participation. These findings are consistent with the service-quality perspective of Grönroos (1984, 1988), which emphasizes the relationship between perceived service performance, expectations, and users' evaluations of service experiences.

The second objective concerned factors influencing sustainable development. Structural equation modeling showed significant relationships between perceived service

quality, service expectations, perceived value, and the SDM-USCS. This result is consistent with Chen (2020), who identified service quality improvement as important for university sports club customer satisfaction, and Huang et al. (2023), who emphasized operational and management optimization based on customer satisfaction. Similarly, Huang and Wang (2021) highlighted the importance of service value perception in college sports clubs, while Chen and Xu (2022) reported that optimizing students' emotional experiences can improve university sports club experiences in Western China. Thus, service quality should address both functional requirements and students' emotional and experiential needs.

For the third objective, the mediation analysis validated perceived value as an important mediating variable. Perceived value significantly mediates the relationships between perceived service quality and satisfaction and between service expectations and satisfaction. This finding indicates that improving service quality or meeting expectations alone may not be sufficient; students must also perceive the services as valuable in functional, emotional, social, and developmental terms. Related evidence from Wu and Huang (2023), Wu (2022), and Zang et al. (2022) supports the role of perceived value in strengthening satisfaction, trust, loyalty, and continued behavioral intentions. Meng and Cui (2021) likewise demonstrated the relevance of satisfaction and loyalty to sustainable development.

Overall, the findings support the SDM-USCS as a useful framework for explaining sustainable development of university sports clubs in Sichuan Province. The model highlights service quality and expectation management as important antecedents, while perceived value functions as a key pathway through which these factors contribute to satisfaction and sustainable development.

Conclusion

This study successfully developed and validated a Sustainable Development Model of University Sports Club Satisfaction (SDM-USCS) in Sichuan Province, China. The study aimed to examine the relationships among perceived service quality, service expectations, perceived value, and university sports club satisfaction, and to determine the role of perceived value in the proposed model. Data were collected from 360 university sports club participants in Sichuan Province. The majority of participants were young males (67.0%) aged 18–22 years, while 76% were students. The findings indicated that improving and maintaining physical health was an important motivation for participating in university sports clubs. The data met the assumptions required for statistical analysis, providing an appropriate basis for hypothesis testing and structural equation modeling. The results supported all seven proposed hypotheses. Perceived service quality and service expectations were found to have positive effects on perceived value and SDM-USCS. In addition, perceived value had a direct positive effect on SDM-USCS and played a significant mediating role in the relationships between perceived service quality, service expectations, and SDM-USCS. These findings indicate that improving service quality and appropriately responding to students' expectations can enhance perceived value, which in turn contributes to higher university sports club satisfaction and sustainable development. The focus group interviews further supported the quantitative findings by identifying perceived service quality, service expectations, and perceived value as important factors influencing university sports club satisfaction. The consistency between the qualitative and quantitative findings strengthens the credibility of the study. Furthermore, the structural equation model demonstrated satisfactory reliability and validity, supporting the applicability of the proposed model.

Overall, the study fulfills its research objectives and contributes both theoretically and practically to the sustainable development of university sports clubs. The SDM-USCS provides a useful framework for university administrators and sports club managers to improve service quality, meet students' expectations, enhance perceived value, and promote sustainable satisfaction among university sports club participants in Sichuan Province, China.

Suggestions

Research Suggestions

To enhance the Sustainable Development Model of University Sports Club Satisfaction in Sichuan Province, three key areas should be addressed. First, perceived service quality should focus on tangibility, reliability, responsiveness, assurance, and empathy by improving facilities, strengthening coach training, increasing service efficiency, and providing personalized services. Second, service expectations should be managed through student feedback, transparent information, identification of student needs, and communication of actual service experiences. Third, perceived value should emphasize functional, emotional, social, and developmental value through effective courses, positive social environments, and student growth mechanisms.

Suggestions for Further Research

Future studies should use comparative case studies, quantitative methods, and longitudinal research to examine university sports club satisfaction. Research should explore additional influencing factors, different types of sports clubs, and emerging technologies. Collaboration among universities and interdisciplinary research involving psychology, education, and management should also be encouraged.

Future Suggestions

As this study focused only on Sichuan Province and used surveys and interviews, future research should expand to other regions and countries. Advanced methods such as SEM and big data analysis should be applied, along with longitudinal studies. Future research should also examine AI, online learning, and changing career expectations among student-athletes.

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