

FACTORS AFFECTING THE INDUSTRIALIZATION MANAGEMENT OF UNIVERSITY STADIUMS IN TIANJIN, CHINA

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Abstract

The Industrialization management of university stadiums in Tianjin has developed rapidly, but there is still a gap compared with other developed cities in China and abroad. In order to solve the development problems of industrialization management of university stadiums in Tianjin, the purpose of this study is: (1) To study the current situation of the Industrialization management of university stadiums in Tianjin, China. (2) To analyze factors affecting the Industrialization management of university stadiums in Tianjin, China. (3) To develop the Industrialization management direction of university stadiums in Tianjin, China. This study adopts a mixed research method that combines qualitative and quantitative methods. First, an interview outline was formulated on the current situation of Industrialization management of university stadiums in Tianjin. Qualitative research data were collected through in-depth interviews with 8 leaders of stadium management and 7 leaders of physical education teaching departments in the universities in Tianjin, total 15 person, and Nvivo12.0 was used to analyze the content. Then a questionnaire survey was conducted on the factors affecting the industrialization management of university stadiums in Tianjin, China. The data for the quantitative study came from 659-person questionnaire data. Smart PLS 4.0 software was used to analyze the collected questionnaire data, establish a structural equation model (SEM), and verify six hypotheses. Through validity testing, the research of Cronbach's alpha values for all variables ranged from 0.867 to 0.910. Through heterogeneous-to-element ratio (HTMT) analysis, it can be seen that the HTMT values between the 24 dimensions are all lower than 0.85. Through Multicollinearity test, the inflation factor values of all items are below the threshold of 3.3. Through common method bias, the explanatory power of the first factor is only 25.128%, The final ratio in this study was 26.30:10. Combined with the model evaluation index SRMR (standardized root mean square residual) of 0.069 and 0.073, the model fit is relatively good. Finally, an interview outline was formulated on the development direction of Industrialization management of university stadiums in Tianjin. Interviews were conducted using focus group discussions. The data for the qualitative research were collected through interviews with 6 university leaders in charge of the management of stadium and 5 university leaders in charge of the physical education department, total 11 person, and the data were analyzed through micro word cloud software and Nvivo12.0 software. Comprehensive research results show that economic environment, management level, market demand, open to the public, policy support, stadium resources positively affect Industrialization management of university stadiums. This study comprehensively elaborates on

the current situation and affecting factors of industrialization management of university stadiums in Tianjin, based on quantitative and qualitative research paradigm to comprehensively analyze the current situation and dilemmas of university stadiums in Tianjin in terms of management models, resource utilization, talent training, and community interaction. It has effectively enriched the theoretical literature and empirical research on the industrialization management of university stadiums; and can help relevant government departments and universities formulate reasonable and effective development policies.

Keywords: University Stadium, Management of University Stadiums, Economic Environment, Management Level, Market Demand, Open to The Public, Policy Support, Stadium Resources.

1. INTRODUCTION

With the development of society, university stadiums have gradually entered the stage of socialist economic development, and their functions and intangible assets have been continuously explored. The construction of sports culture in most universities is relatively lagging behind. Some universities overemphasize the competitive service function of stadiums and ignore the fitness, entertainment and diversified development of stadiums (Shi, 2021).

As the main place for organizing and holding important events and mass fitness, university stadiums are constantly in line with the market economy, and play a significant role in improving China's economic and social benefits as well as ecological benefits. Therefore, the integration of university stadiums into Industrialization is an inevitable product of the development of market economy (Liang, 2019).

Tianjin has very strong economic strength, according to the official display of the Tianjin Municipal Education Commission, there are 53 higher education institutions in Tianjin. Led by the market demand, it should vigorously exert the resource advantages of university stadiums to promote the development of stadium.

2. LITERATURE REVIEW

2.1 Theories of target market strategy

The enterprise regards the entire market of the product as the target market, analyzes its position in the market, and uses the enterprise's own resource advantages to carry out strategic decision-making theory of marketing management (Fred, 1998).

Based on specific market segmentation, consumers' purchasing behaviors and habits can be understood in detail, which is helpful to discover market opportunities and characteristics, and formulate relevant marketing mix strategies to improve the competitiveness of enterprises.

Differentiated positioning strategy theory can meet the needs of different customer groups Market positioning can help companies create distinctive products and explore new market areas (Wu et al., 2018).

The use of target market strategies in stadium management is critical to help better meet the needs of spectators and stakeholders, improving the profitability and reputation of the stadium.

2.2 Research on the Industrialization management of university stadiums

2.2.1 Research on stadium resources

Qiu (2019) Currently, the number of university stadiums outsourced and operated in Kunming is relatively small. The internal factors for the outsourced operation of Kunming University Stadium are mainly geographical location, insufficient resource allocation, and insufficient leadership awareness.

2.2.2 Research on management level

Zhang (2019) There are many problems in the management of university gymnasiums in Hubei Province, including non-standard management, unprofessional management teams, lack of high-quality management personnel, and imperfect management systems and systems. Wang (2018) The main factors affecting the management level of university stadiums include operating price, means, environment and operation management level.

2.2.3 Research on open to the public

Wang (2022) The number of university stadiums in Shanxi Province is relatively large, which can meet daily teaching needs. There are problems such as waste of sports resources, few service projects, and insufficient promotion capabilities. The degree of openness is not only affected by the management model of the stadium, but also by safety factors and external publicity efforts. Zhang (2022) Taiyuan City University Stadium is mainly to protect students' learning. Most teachers and students of university gymnasium support opening to the outside world, but there is a lack of professional operating mechanism in terms of opening to the public, and there are problems such as insufficient quantity, safety and funding.

2.2.4 Research on economic environment

Yang (2021) Achieving high-quality development of the sports industry requires internal driving forces such as internal production supply, consumer demand, and factor support, as well as external driving forces such as consolidating the economic foundation, improving safeguard measures, strengthening industry roles, and optimizing the external environment for industrial development... It is very important to establish and improve the management mechanism in the development of the university sports economic market. Shi (2021) College university stadiums lack innovative awareness in investment and financing and socialized operations, and the economic benefits of investors should be fully considered when introducing social capital.

2.2.5 Research on policy support

Lu et al. (2022) The implementation of sports development policies is insufficient and lacks corresponding regulatory constraints and related evaluation mechanisms. In the actual implementation of sports industry policies, there are problems such as lack of policy promotion, insufficient execution of executive agencies, and lack of recognition by sports enterprises.

Wu (2022) found in the study of sports industry policy texts that supply-based policy tools are insufficiently used, environmental policy tools are used too much, demand-based tools are missing, and the utilization of the industrial value chain is unbalanced.

2.2.6 Research on market demand

Wang et al. (2023) The main task of university stadiums is to provide professional sports venue services for students and staff. Universities need to establish an efficient evaluation mechanism and service platform to establish a basis for evaluation of university stadiums that serve society. Zhai (2021) introduced the socialized operation model into the management and operation activities of university university stadiums, which can meet the public's exercise needs, make full use of university sports resources, and improve economic and social benefits.

2.3 Research Framework

Through literature summary, this study uses stadium resources, management level, open to the public, economic environment, policy support, and market demand as independent variables. Industrialization management of university stadiums is used as the dependent variable. Build the model as shown below:

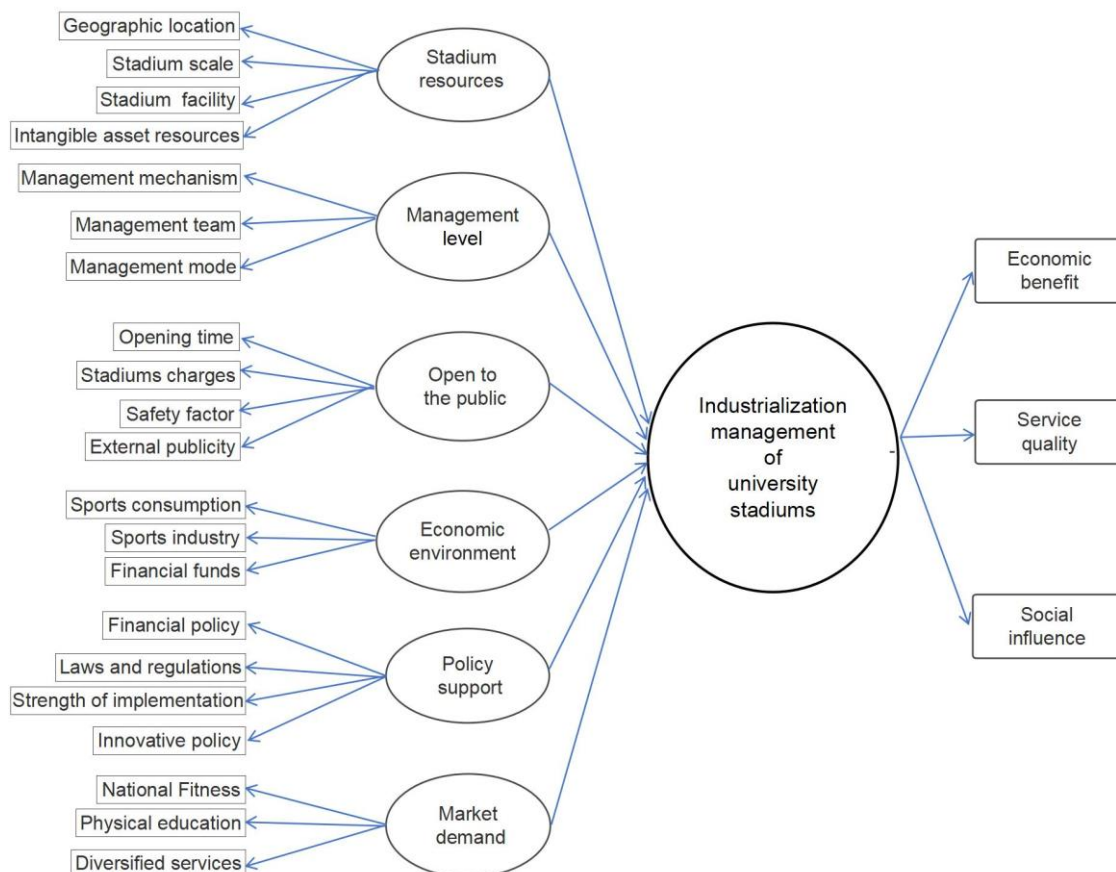


Figure 1: Conceptual model

According to Figure 4.1 shows the word frequency cloud. Words such as insufficient, potential, reference, development, education, needs, economic, ignored, proposed, support, develop, based, single, and aspects mainly relate to the current situation and difficulties of the industrialization of university stadiums in Tianjin, China. Through research summary, the results of current situation of industrialization management of university stadiums in Tianjin show that : (1)The hardware facilities of university stadiums are constantly optimized. (2)Diversified development of university stadiums management models. (3) Expansion of consumer groups in university stadiums. (4)University stadiums funds are composed of financial allocations and opening revenue. (5)University stadiums have high safety factor and different accident handling methods. (6)University sports culture is increasingly enriched.

4.2 Quantitative analysis on analysis of factors affecting the Industrialization management of university stadiums in Tianjin, China

4.2.1 Demographic Information and descriptive statistical analysis

A total of 700 questionnaires were distributed in this study, and 659 people received valid questionnaires, with an effective response rate of 94.14%. In terms of gender, 432 people (65.55%) chose Male, 227 people (34.45%) chose Female, and in terms of age, 9 people (1.37%) chose under 30 years old (including 30 years old). 46 people (6.98%) chose 30-35 years old (including 35 years old), 148 people (22.46%) chose 35-40 years old (including 40 years old), and 40-45 years old (including 45 206 people (31.26%) chose over 45 years old), 250 people (37.94%) chose over 45 years old, 180 people (27.31%) chose specialist and below from the educational background, and 117 people chose Bachelor's degree People (17.75%), 339 people (51.44%) chose Master's degree, 23 people (3.49%) chose Doctoral degree and above, and 207 people (31.41%) chose managers of university stadium from the perspective of occupation. 452 people (68.59) chose University physical education teacher, 75 people (11.38%) chose one year and below (including one year) in terms of length of service, and 158 people chose 2-4 years (including 4 years). people (23.98%), 66 people (10.02%) chose 5-7 years (including 7 years), 213 people (32.32%) chose 8-9 years (including 9 years), and 147 people chose More than 10 years. (22.31%).

4.2.2 Reliability and validity analysis

In this study, the PLS algorithm (Partial Least Squares algorithm) was used to analyze the measurement model. Since there are second-order reflective variables in the model, their measurement needs to be reflected by the corresponding first-order variables. Therefore, following the method of Wetzels et al (Wetzels et al., 2009). This paper treats the path coefficients between second-order variables and their corresponding first-order variables as factor loadings of the second-order variables, and uses them to calculate the composite reliability of the second-order variables (CR) and average variance extraction (AVE) (Sarstedt et al., 2019). In this paper, AVE is the abbreviation of average variance extraction (Sun et al., 2019).

Reliability is mainly used to test the consistency and stability of the scale. In SmartPLS, reliability indicators mainly include Cronbach's α and CR values (Hair et al., 2011). Cronbach's alpha values for all variables ranged from 0.867 to 0.910.

4.2.3 Multicollinearity test

Before analyzing the mediation model, it is important to ensure that there are no multicollinearity issues between variables (Cha et al., 2019). Therefore, in this study, the evaluation of the variance inflation factor (VIF) was performed by running the PLS algorithm. The inflation factor values of all items are below the threshold of 3.3 (Kock and Lynn, 2012). This indicates that there is no significant multicollinearity problem in this study.

4.2.4 Common method bias

Common method bias refers to the artificial covariance between predictor variables and criterion variables caused by the same data source or rater, the same measurement environment, background, and characteristics of the items themselves (Zhou and Long, 2004).

Participants, testing tools, testing environments, etc. may all lead to common method bias (Podsakoff et al., 2003). In order to alleviate the problem of common method bias, this study adopted a pre-control method. The questionnaire survey was conducted anonymously, and the sample data and personal information were promised to be kept strictly confidential to reduce the concerns and individual biases of the respondents and ensure the validity and authenticity of the data.

First, Harman's single factor test was conducted using SPSS 25.0. The results show that the explanatory power of the first factor is only 25.128%, which is lower than the 40% standard (Harman, 1961), so it can be concluded that there is no common method bias problem.

Secondly, referring to the common method factor analysis of Liang et al (2007), the ratio between the squared mean of the substantive factor loadings and the squared mean of the common method variance (CMV) factor loadings is used to evaluate whether there is a common method bias problem, such as shown in Table12. The final ratio in this study was 26.30:10, indicating that the ratio was large and therefore there was no common method bias issue (Liang et al., 2007).

4.2.5 Hypothesis Testing

In this study, we use SmartPLS to perform the PLS algorithm and obtain the R^2 value, which represents the proportion of the dependent variable in the model that is explained

Table 1: Path analysis

Path	Original sample (O)	Standard Deviation (STDEV)	T statistics (O/STDEV)	P values	95% CI LOWER	95% CI UPPER	f-square	R-square	R-square adjusted
Economic environment -> Industrialization management of university stadiums	0.133	0.034	3.952	0	0.067	0.199	0.025	0.65	0.647
Management level -> Industrialization management of university stadiums	0.152	0.033	4.581	0	0.086	0.216	0.034		
Market demand -> Industrialization management of university stadiums	0.15	0.034	4.364	0	0.083	0.218	0.032		
Open to the public -> Industrialization management of university stadiums	0.207	0.034	6.005	0	0.139	0.274	0.053		
Policy support -> Industrialization management of university stadiums	0.168	0.038	4.383	0	0.092	0.245	0.034		
Stadium resources -> Industrialization management of university stadiums	0.175	0.036	4.876	0	0.106	0.246	0.04		



Figure 3: Path model diagram verified

4.2.6 PLS Predict Analysis

Based on the suggestions of Shmueli et al. (2019), the PLS prediction method is proposed. This is a holdout-based procedure that utilizes PLS-Predict to generate predictions at the case or construct level, employing a 10-fold procedure to examine the relevance of interaction effects. Shmueli et al. (2019) pointed out that if all time differences are below a certain threshold, there is strong predictive power. If all differences are above the threshold, the predicted correlation cannot be confirmed. If the majority is below the threshold, it has moderate predictive power; if the minority is below the threshold, it has low predictive power. According to Table 4.18, the error of the PLS model is lower than that of the LM model. Therefore, we can conclude that our model has strong predictive power. Combined with the model evaluation index SRMR (standardized root mean square residual) of 0.069 and 0.073, the model fit is relatively good.

Table 2: Standardized Root Mean Square Residual(SRMR)

	Saturated model	Estimated model
SRMR	0.069	0.073

4.2.7 Conclusion of quantitative analysis

In the quantitative analysis part, statistical analysis software such as SPSS 27.0 and Smart-PLS 4.0 were used to conduct descriptive statistics, reliability analysis, factor analysis, and testing of direct and mediated effects. The model is predicted based on 659 valid samples collected through questionnaire surveys. As shown in the analysis results in Table 3, all six main hypotheses were verified.

Table 3: Summary of Hypothesis Testing Results

Number	Hypothesis	Result
H1	The economic environment has a positive impact on the industrialization management of university stadiums.	Accept
H2	Management level has a positive impact on the industrialization management of university stadiums.	Accept
H3	Market demand has a positive impact on the industrialization management of university stadiums.	Accept
H4	Openness to the public has a positive impact on the industrialization management of university stadiums.	Accept
H5	Policy support has a positive impact on the industrialization management of university stadiums.	Accept
H6	Stadium resources have a positive impact on the industrialization management of university stadiums.	Accept

Through analysis, it is verified that the six aspects of economic environment, management level, market demand, open to the public, policy support, and stadium resources have a positive impact on the development of industrialization management of university stadiums in Tianjin, China.

capabilities, and professional services. From the perspective of open to the public, experts believe that the cultural and social functions of stadiums and improving public participation are top priorities. From the perspective of the economic environment, experts believe that the economic benefits and financial management of university stadiums, tourism and hosting events, advertising and media use are key aspects of the economic development of stadiums. At the same time, cost-effectiveness needs to be considered amid economic uncertainty. From the perspective of policy support, experts put forward ideas such as innovation policies, talent introduction, resource support and financial incentives. From the perspective of market demand, experts pointed out that modern technology should be used to improve operational efficiency and customer experience, and effective market strategies should be adopted.

5. CONCLUSION AND SUGGESTION

5.1 Conclusion

By summarizing and analyzing the interview outline data, from the current situation of Industrialization management of university stadiums in Tianjin, the hardware facilities of university stadiums are constantly optimized, the management models of university stadiums are diversified, the scope of consumer groups of university stadiums is expanded, and the university stadiums funds are allocated by financial allocation and venues. The revenue structure is open, university stadiums have high safety factors and different accident handling methods, university sports culture is increasingly enriched, and sports professionals are increasing year by year. Use SMART-PLS and Spss software to conduct correlation analysis and causal analysis of the questionnaire on the influencing factors of the industrialization management of university stadiums in Tianjin. Through comprehensive analysis of the data, we draw the following conclusions: Economic environment, Management level, Market demand, Open to the public, Policy support, Stadium resources has a positive impact on the Industrialization management of university stadiums in Tianjin, China.

This study summarizes and organizes the above six perspectives. Experts recommend the future development direction of industrialized management of sports venues as follows: (1) Optimize resource allocation and improve standardization construction; (2) Update concepts of universities and promote the socialization of resources; (3) Strengthen talent cultivate and manage professional transformation; (4) Improve management systems and develop a virtuous cycle; (5) Support industrialization in multiple dimensions and improve sustainability. (6) Make rational use of stadium resources and strengthen openness to the public.

5.2 Suggestion

5.2.1 Optimize resource allocation and improve standardization construction

In terms of optimizing resource allocation, it is necessary to conduct a comprehensive resource survey and demand analysis on the number, location, scale, and facility configuration of university stadiums in Tianjin to clarify the specific needs of various sports projects and the distribution of existing resources.

5.2.2 Update concepts and promote the socialization of university stadium resources

Universities should update concepts and establish industrialization awareness, share resources and promote the socialization of sports resources.

5.2.3 Strengthen talent training and manage professional transformation

Universities should pay attention to the professional quality and ability cultivation of stadiums managers, and actively introduce management and operation talents with professional backgrounds to assume management positions in stadiums.

5.2.4 Improve the management system and develop a virtuous cycle

For the innovation and optimization of management systems, it is necessary to formulate more specific, detailed rules and regulations that are suitable for the characteristics of university, strengthen the execution of the system, ensure clear responsibilities, and stimulate the enthusiasm of managers through effective incentive mechanisms.

5.2.5 Promote industrialization in multiple dimensions and improve sustainability

Industrialization should be empowered from two aspects: characteristic operation and the construction of professional sports and fitness guidance and training.

5.3 Future research

Although criticisms and suggestions have been made on the management of university stadiums in Tianjin, there are still challenges in applying theory into practice. Therefore, future research should pay attention to the transformation of theory and practice, and cooperate with local governments, universities, and communities to promote the management of university stadiums.

References

- 1) Cha, J., Kim, S. Y., & Jang, W. (2019). Influence of restaurant innovativeness on customer satisfaction and behavioral intentions: Role of innovation type. *International Journal of Hospitality Management*, 76, 58-66.
- 2) Fred R. David. (1998). *Strategic Management*. Economic Science Press.
- 3) Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, 19(2), 139-151.
- 4) Harman, H. H. (1961). *Modern factor analysis*. University of Chicago Press.
- 5) Kock, N., & Lynn, G. S. (2012). Lateral collinearity and misleading results in variance-based SEM: An illustration and recommendations. *Journal of the Association for Information Systems*, 13(7), 546-580.
- 6) Liang, J., Farh, C. I., & Farh, J. L. (2007). Psychological antecedents of promotive and prohibitive voice: A two-wave examination. *Academy of Management Journal*, 50(3), 659-677.
- 7) Liang, L. H. (2019). *Research on socialized service of sports venues resources in Shanxi University from the perspective of supply-side reform (Master's thesis)*. Shanxi: Shanxi Normal University.
- 8) Lu, T. X., Liu, Y. X., Li, G. Z. (2022). Dilemma and Countermeasures Research on the Development of Sports in Yunnan Province Colleges and Universities in the New Era. *Journal of Shangqiu Normal College*, 2023-12(38), 42-45.

- 9) Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903.
- 10) Qiu, Q. L. (2019). Research on outsourcing operation of university stadium resources in Kunming (Master's thesis). Yunnan: Yunnan Normal University.
- 11) Sarstedt, M., Hair, J. F., Ringle, C. M., Thiele, K. O., & Gudergan, S. P. (2019). Estimation issues with PLS and CBSEM: Where the bias lies! *Journal of Business Research*, 69(10), 3998-4010.
- 12) Shi, L. L. (2021). Empirical research on investment and financing models of university sports venues .(Master's thesis). Henan: Henan University.
- 13) Shi, L. L. (2021). Empirical research on investment and financing models of university sports venues .(Master's thesis). Henan: Henan University.
- 14) Shmueli, G., Ray, S., Estrada, J. M. V., & Chatla, S. B. (2019). The elephant in the room: Predictive performance of PLS models. *Journal of Business Research*, 100, 383-390.
- 15) Sun, H., Zhang, P., & Wang, H. (2019). Big data analytics in preventive medicine. In *Big Data Analytics in Cybersecurity and Healthcare* (pp. 123-148). Springer.
- 16) Wang, H. C. (2018). Investigation and analysis of the current situation of opening and operation and management of university sports venues in Anhui Province .(Master's thesis). Anhui: Anhui Normal University.
- 17) Wang, J. J. (2023). Research on the evaluation and countermeasures of bank As operation and management level based on the camel evaluation method (Master's thesis). Shanxi: Shanxi University of Finance and Economics.
- 18) Wang, R. X. (2022). Survey research on socialized services and the current situation of using sports venues in universities in Shanxi Province.(Master's thesis). Shanxi: Shanxi University.
- 19) Wetzels, M., Odekerken-Schröder, G., & van Oppen, C. (2009). Using PLS path modeling for assessing hierarchical construct models: Guidelines and empirical illustration. *MIS Quarterly*, 33(1), 177-195.
- 20) Wu, X. G., & Chen, Y. X. (2018). Analysis and inspiration of the operation mode of US university sports stadiums. *Journal of Physical Education and Adult Education*, 48-54+66.
- 21) Wu, X. L. (2022). Research on the policy text of the sports industry in China.(Master's thesis). Hubei: Huazhong Normal University.
- 22) Yang, J. Y. (2021). Research on wisdom construction of large stadiums under the background of the Internet. *Sports Style*, 134-136.
- 23) Zhai, H. H. (2021). New exploration of socialized management of college sports venues in the era of the sharing economy. *Journal of Beijing Institute of Graphic Arts*, 29(9).
- 24) Zhang, J. (2019). Research on Optimization Countermeasures of Sports Venue Management in Colleges and Universities in Hubei Province Based on Sports Public Service Theory. (Master's Thesis) Hubei: Huazhong University of Science and Technology.
- 25) Zhang, X. (2022). Research on the status quo and optimization argumentation of opening badminton stadiums of universities in Taiyuan to the outside world. (Master's thesis). Shanxi: North Central University
- 26) Zhou, H., & Long, L. (2004). Statistical remedies for common method biases. *Advances in Psychological Science*, 12(6), 942-950