Research On The Construction Of Competency Model For Chinese Tennis Coaches

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ARTICLE INFO	ABSTRACT
	The tennis industry in China is rapidly developing, necessitating a focused effort to enhance the capabilities of tennis coaches to meet the demands of this rapid growth. This study utilizes various research methods including literature review, field surveys, key event technique interviews, Delphi method, and statistical analysis to explore the essential competencies required of Chinese tennis coaches. A competency model consisting of four dimensions and 14 competency indicators has been established, covering cognitive abilities (coaching philosophy, professional experience, analysis, learning), professional skills (training program development, player guidance, motivation), management abilities (communication skills, influence, coordination, problem-solving), and personal traits (achievement motivation, innovation, emotional control). Exploratory factor analysis and confirmatory factor analysis demonstrate that the four-dimensional model exhibits a high level of fit across various fit indices, validating the model effectively. Furthermore, a 36-question assessment scale has been designed to evaluate these competency characteristics. Survey results indicate that Chinese tennis coaches excel primarily in professional skills, followed by personal traits, management abilities, and cognitive capabilities. By employing this model, a structured coach selection approach has been proposed, providing crucial support for enhancing human resource management in Chinese tennis.

Keywords: Tennis Coaches；Competency Characteristics；Competency Model Coach Selection；Human Resource Management |

1.Introduction

In recent years, tennis has experienced significant growth and development in China, highlighting the increasingly important role of tennis coaches in sports education. However, this expansion has also exposed challenges faced by the current coaching workforce, particularly in professional skills, teaching methods, and psychological qualities, thereby constraining the development of tennis in China (Ferrari, Diana, & Tan., 2023). Therefore, establishing a systematic and practical competency model for tennis coaches is of great theoretical and practical significance for enhancing the professional competence and overall quality of tennis coaches in China (Yuan, & Yi-Hsiang., 2021). Competence requires a comprehensive integration of knowledge, skills, attitudes, and values required for specific roles. For tennis coaches, competence includes several key dimensions. Firstly, professional knowledge includes tennis theory, training methods, and match strategies (i Rius, i Obrador, & Celda., 2017). Secondly, teaching skills encompass course structure, teaching methods, and performance evaluation. Thirdly, psychological qualities include stress management, confidence, and emotional regulation(Martínez-Gallego, Nash, & Crespo., 2023). Lastly, communication and collaboration skills involve effective interaction with athletes and fostering teamwork. However, contemporary coaches face various challenges such as managing individual athlete differences, innovating training methods, and coping with competitive pressures (Ji, Xu, Cheng, Sun, & Zhang., 2021). It is crucial to enhance coaching capabilities to effectively address these challenges.The development of a tennis coaching competency model will not only elevate the professional status of coaches but also propel tennis into new heights(Zhang., 2023). This study will construct a tennis coaching competency model, refining the selection, training, and evaluation of coaches to enhance the overall quality of the coaching workforce and promote the development of tennis. Through the

construction of the competency model, scientific guidance and assessment tools will be provided to strengthen the professional development and training of tennis coaches.

2.Methodology

2.1Construction of Tennis Coaching Competency Model

The construction of the competency model is based on the Iceberg Theory: human activities are influenced by two levels, the explicit and the implicit, with the critical unseen implicit level determining behavior(Chen., 2024). Drawing on extensive research by sports scholars on coaching competency, and considering the characteristics of tennis and the professional features of tennis coaches(Cai, Cheng, & Ke., 2022), this study investigates the competency index system of Chinese tennis coaches. It refines measurement items of coaching competency, develops measurement scales, and constructs a competency index system for tennis coaches. Based on the constructed competency index system, surveys will be distributed to coaches engaged in tennis coaching. Statistical analysis of the collected questionnaire data will be conducted to establish the influence factor index system of Chinese tennis coaching competency. Comprehensive analysis will be performed on the influence pathways and mechanisms of these factors to enrich and refine research outcomes related to the competency of Chinese tennis coaches. Focusing on the job content of professional tennis coaches, discussions will be held regarding the competency requirements of tennis coaching positions (Huo et., 2019). This will provide essential theoretical groundwork for the empirical research in constructing the competency characteristic model, facilitating a comprehensive integration of theoretical analysis and practical research. The study will combine various methods including job analysis, literature analysis, critical incident technique, Delphi method, and mathematical statistics to scientifically and accurately construct the competency characteristic model of Chinese tennis coaches (Chi Yong, 2022). The primary construction process is outlined in Figure 1.

Figure 1. Competency Framework Model Construction Approach
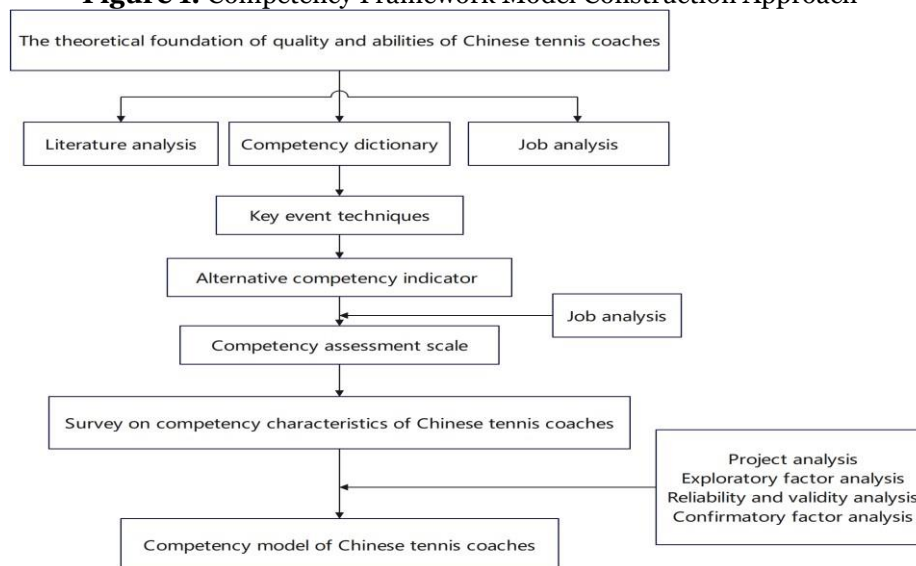
2.2Literature Analysis Extraction

In studies related to Chinese coaches, the concept of competency was introduced relatively late. Based on literature from the past two decades regarding coaches' teaching abilities, comprehensive capabilities, and quality requirements, we understand that Chinese scholars have a high level of interest in coach-related issues(Li, Li, Hu, & Chen., 2021). However, these studies rarely correlate coaches' qualities and abilities with coaching outcomes (Li, Carson, & Collins., 2024), failing to dynamically demonstrate the relationship between coaching behavior and job performance, and lacking discriminatory research on these indicators (Chen, & Chen., 2022). Current studies rarely conduct in-depth research by dividing projects into different aspects; instead, they mainly extract and summarize similar characteristics of coaches, lacking thorough exploration of the traits of coaches in different categories(Cao Hao, 2023). Therefore, few of these achievements meet the standards for direct extraction of competency features. During the literature analysis, a wide range of terms related to the qualities, behaviors, and attitudes of sports coaches were collected and summarized based on the essence of competency research and the guiding principles for constructing competency models (He Jinsheng, 2022). Extracting and summarizing relevant competency terms about tennis coaches from the literature analysis, unifying descriptions for certain entries, and removing duplicates and irrelevant terms, a total of 22 competency indicators were obtained. This preliminary compilation forms the main content of the Chinese tennis coach competency dictionary, as shown in Table 2 below.

Table 2. Initial indicators of competence for tennis coaches

Serial number	Competency indicators	Serial number	Competency indicators
1	Coaching philosophy	12	Sense of responsibility
2	Professional experience	13	Interpersonal understanding
3	Development of training plans	14	Innovation
4	Tennis competitive tactics knowledge	15	Adaptability
5	Overall coordination	16	Aptitude for learning
6	Communication skills	17	Achievement motivation
7	Training load monitoring	18	Competitiveness
8	Information gathering ability	19	Fairness and justice
9	Talent development	20	Authority
10	Motivation	21	Analysis and synthesis
11	Insight	22	Emotional control

2.3 Expert Consultation and Selection Process and Criteria

The Delphi method typically involves three to four rounds of expert consultation. In this study, three rounds of expert consultation were conducted. Experts were asked to assess and select the importance of competency indicators and measurement items in the questionnaire based on their experience and knowledge. Subsequently, statistical analysis was conducted on the questionnaire data to remove indicators and measurement items that inadequately reflected the competencies of tennis coaches, retaining those approved by the experts. This process yielded an optimized content of competency model and its evaluation scale.

Concentration of expert opinions, indicated by the mean scores of each indicator（M_i）. A higher mean score assigned by experts reflects greater importance of the indicator. In this study, indicators with a mean score less than 4.0 were considered for deletion or modification based on expert feedback.

Coherence of expert opinions (coefficient of variation V_i), which measures the consistency of expert evaluations. The coefficient of variation is calculated as the ratio of the standard deviation to the mean of each indicator. A lower coefficient of variation indicates higher consensus among experts regarding the indicator; conversely, a higher value indicates lower consensus. An indicator is considered to lack consensus among experts if its coefficient of variation is greater than or equal to 0.25, prompting further consideration for deletion or modification based on expert feedback. Let X_{ki} represent the score of the k-th expert on the i-th indicator, with m experts and n indicators in total.

$$\text{Mean of the i-th indicator: } M_i = \frac{1}{m}\sum_{k=1}^{m} X_{ik}$$

$$\text{Standard deviation of the i-th indicator: } S_i = \sqrt{\frac{1}{m}\sum_{k=1}^{m}\left(X_{ik} - M_i\right)^2}$$

$$\text{Coefficient of variation of the i-th indicator: } V_i = \frac{S_i}{M_i}$$

2.4 Analysis of Expert Consultation Results

Based on the results of the second round of expert consultations, modifications, deletions, and mergers were made to the 16 measurement items. Subsequently, 16 competency indicators and their corresponding 44 competency measurement items were refined. These refined measurement items were used to construct an assessment scale for the third round of questionnaire surveys. Through data analysis, the statistical results of the competency indicators and measurement items obtained are presented in Table 3 below.

Table 3. Statistical Results of Competency Indicators from the Third Round of Expert Consultations

Competency Indicators	Mean (Mi)	Standard Deviation (Si)	Coefficient of Variation (Vi)
A1. Coaching Philosophy	4.86	0.7669	0.1578
A2. Insight	4.63	0.6815	0.1472
A3. Analysis and Synthesis	4.69	0.6120	0.1305
A4. Rich Experience	4.51	0.7581	0.1681

A5. Training Plan Development	4.87	0.5829	0.1197
A6. Problem Solving	4.78	0.6486	0.1357
A7. Player Guidance	4.72	0.7203	0.1526
A8. Motivation	4.68	0.6772	0.1447
A9. Coordination and Planning	4.77	0.7675	0.1609
A10. Communication Skills	4.74	0.7118	0.1501
A11. Influence	4.67	0.7860	0.1683
A12. Achievement Motivation	4.82	0.6078	0.1261
A13. Innovation	4.83	0.6409	0.1327
A14. Aptitude for Learning	4.76	0.7288	0.1531
A15. Emotional Control	4.71	0.6523	0.1385
A16. Competitiveness	4.62	0.7914	0.1713

2.5 Preliminary Competency Assessment Scale for Tennis Coaches

In summary, following three rounds of expert consultation surveys, 8 initial competency indicators were deleted from the initial competency indicators, and 24 measurement items were merged, modified, or deleted. After three modifications, the evaluation scale received higher agreement from the expert panel. Based on this, the competency assessment scale for Chinese tennis coaches was developed, containing 44 measurement items reflecting a total of 16 competency indicators, as shown specifically in Table 4 below.

Table 4. Contents of the tennis coach competency model indicators

Serial number	Competency indicators	Serial number	Competency indicators
A1	Coaching Philosophy	A9	Coordination and Planning
A2	Insight	A10	Communication Skills
A3	Analysis and Synthesis	A11	Influence
A4	Rich Experience	A12	Achievement Motivation
A5	Training Plan Development	A13	Innovation
A6	Problem Solving	A14	Aptitude for Learning
A7	Player Guidance	A15	Emotional Control
A8	Motivation	A16	Competitiveness

2.6 Reliability and Validity

The "Chinese Tennis Coaches' Competency Self-Assessment Questionnaire Survey" targeted participants from Chinese tennis coach training classes from 2019 to 2021. A total of 200 questionnaires were distributed using a combination of electronic and paper-based formats, with 185 questionnaires returned, yielding a response rate of 92.5%. Among these, 178 questionnaires were deemed valid, resulting in an effective response rate of 89%. This study conducted internal consistency tests on the survey questionnaire, examining the consistency and reliability of the items within each dimension, ultimately assessing the overall reliability of the questionnaire. As shown in Table 5, the Cronbach's alpha coefficients for the four dimensions—business competency, professional demeanor, interpersonal relationships, and personal qualities—were 0.883, 0.861, 0.832, and 0.869, respectively. The overall reliability coefficient of the questionnaire was 0.885, indicating that the data collected from this questionnaire exhibited good reliability.

Table 5. Internal Consistency Coefficients for Each Dimension and Overall Self-Assessment Questionnaire

Dimension	Cronbach's Alpha	Items
Business competence	0.883	27
Professional competence	0.861	13
Interpersonal relationships	0.832	11
Personal qualities	0.869	14
Overall reliability and total number of items	0.885	65

The construct validity of the "Chinese Tennis Coaches Competency Self-Assessment Questionnaire" was examined by calculating KMO and Bartlett's test of sphericity. The results, as shown in Table 6, indicate a KMO measure of sampling adequacy of 0.759, and a significant Bartlett's test of sphericity (p = 0.000). The questionnaire structure demonstrates good validity.

Table 6. KMO and Bartlett's sphericity test

Sampling Adequacy Measure	KMO	.759
Bartlett's Sphericity Test	Significance	.000

3.Results and Analysis

3.1Descriptive Statistics and Analysis

A survey was conducted among relevant experts, and statistical analysis was performed on 82 valid questionnaires to investigate the distribution of competency characteristics among respondents. The distribution is as follows: trainer for coach instructors accounted for 23.17%, senior coach instructors for 25.61%, intermediate coach instructors for 20.73%, and junior coach instructors for 30.49%. The specific details of the respondents are shown in Table 7 below.

Table 7. Distribution of Competency Characteristics Among Respondents (N=82)

Category	Number of people	Percentage (%)
Coach Trainer	19	23.17
Senior Coach	21	25.61
Intermediate Coach	17	20.73
Junior Coach	25	30.49
Total	82	100

3.2Analysis of the Verification of Tennis Coach Competency Model

We employed the commonly used critical ratio (CR) method to assess the discriminant validity of questionnaire items, calculating the critical value (CR) for 16 competency indicators. If the CR value reaches significance level (i.e., P<0.05), it indicates that the indicator can serve as a measurement criterion for distinguishing between excellent and average tennis coaches and should be retained. Conversely, if not, it suggests that the discriminant validity of the competency indicator is low and should be considered for removal. After combining and processing the measurement items in the questionnaire, we obtained scores for each competency indicator. Subsequently, we calculated the total scores obtained by each participant in each competency indicator, sorted the samples from highest to lowest, and selected the top 27% scorers as the high-ranking group and the bottom 27% scorers as the low-ranking group. We then examined the score statistics of the high and low-ranking groups for each competency indicator, as shown in Table 8 below.

Table 8. Descriptive Statistics of Measurement Items for High and Low-Ranking Groups

Indicator	Group	Quantity	Mean	S.D.	Indicator	Group	Quantity	Mean	S.D.
	1.00	22	4.21	0.8371		1.00	22	4.52	0.6134
A1	2.00	22	2.78	0.3942	A9	2.00	22	3.48	0.4829
	1.00	22	4.33	0.7053		1.00	22	4.36	0.4730
A2	2.00	22	2.97	0.2918	A10	2.00	22	3.71	0.3708
	1.00	22	4.73	0.8021		1.00	22	4.52	0.7220
A3	2.00	22	3.79	0.4110	A11	2.00	22	3.69	0.7014
	1.00	22	4.56	0.7692		1.00	22	4.07	0.5635
A4	2.00	22	4.32	0.6897	A12	2.00	22	3.13	0.4382
	1.00	22	4.30	0.4916		1.00	22	4.59	0.6627
A5	2.00	22	2.94	0.2527	A13	2.00	22	3.67	0.3791
	1.00	22	4.28	0.6418		1.00	22	4.34	0.8254
A6	2.00	22	2.82	0.3072	A14	2.00	22	3.66	0.5418
	1.00	22	4.52	0.5501		1.00	22	4.27	0.6492
A7	2.00	22	3.67	0.3264	A15	2.00	22	3.38	0.5831

	1.00	22	4.33	0.6739		1.00	22	4.61	0.8312
A8	2.00	22	3.46	0.4001	A16	2.00	22	4.43	0.7859

Note: 1.00 represents the high-level group, and 2.00 represents the low-level group.

The competence feature indicators data of the high-level and low-level groups mentioned above were imported into SPSS 18.0 for project analysis. An independent sample t-test was used to calculate the significance level of the mean score differences between the high-level and low-level groups on each competence feature indicator, thereby determining the CR values for each indicator. The statistical results show that among the 16 competence feature indicators, 2 did not reach statistical significance ($P > 0.05$), specifically "A2 Insight" and "A16 Competitiveness". This indicates that there was no difference in performance between the high-level and low-level groups on these two competence feature indicators, so they were excluded. The remaining 14 competence feature indicators all reached statistical significance and were retained for exploratory factor analysis.

3.3 Exploratory Factor Analysis

Exploratory factor analysis (EFA) determines the number of factors based on the common criterion that the cumulative variance contribution rate should exceed 80%. Each variable has factor loadings on each common factor, and the assignment of each variable to a common factor is determined by the magnitude of the factor loading. Generally, if the loading value of an indicator is greater than 0.4 in absolute terms, it is considered significant; if it exceeds 0.5, it is considered highly significant. Therefore, indicators with loadings below 0.4 should be considered for removal.

Table 9. Competency structure factor analysis results

Competency structure factor	F1	F2	F3	F4
S1. Coaching Philosophy	0.749	0.159	0.148	0.201
S2. Professional Experience	0.636	0.127	0.116	0.344
S3. Analysis and Synthesis	0.633	0.235	0.178	0.149
S4. Aptitude for Learning	0.549	0.264	0.253	0.126
S5. Developing Training Plans	0.204	0.711	0.122	0.150
S6. Problem Solving	0.199	0.299	0.513	0.159
S7. Guiding Players	0.205	0.609	0.216	0.304
S8. Motivation	0.171	0.527	0.207	0.164
S9. Coordination and Planning	0.246	0.240	0.551	0.162
S10. Communication Skills	0.334	0.217	0.764	0.208
S11. Influence	0.332	0.192	0.661	0.178
S12 .Achievement Motivation	0.283	0.160	0.132	0.791
S13. Innovation	0.202	0.203	0.295	0.636
S14. Emotional Control	0.277	0.324	0.327	0.539

Based on Table 9, it can be seen that according to exploratory factor analysis with a criterion of factor loading greater than 0.5 for each variable, Factor 1 reflects four competence indicators: coaching philosophy, professional experience, analysis and synthesis, and a propensity for learning. Factor 2 reflects three competence indicators: training program development, player guidance, and motivation. Factor 3 includes four competence indicators: communication skills, influence, coordination, and problem-solving. Factor 4 reflects three competence indicators: achievement motivation, innovation, and emotional control. A total of 14 competence indicators meeting the standard were extracted through exploratory factor analysis, presenting a clear four-dimensional structure. Based on the results of exploratory factor analysis and a comprehensive analysis of the competence indicator content and attributes, the four competence dimensions are named as follows:

Dimension 1: The items "coaching philosophy," "professional experience," "analysis and synthesis," and "propensity for learning" belong to the cognitive and thinking aspects of coaching. "Coaching philosophy" encompasses the coach's static knowledge structure and dynamic cognitive thinking style. "Professional experience" and "analysis and synthesis" belong to dynamic cognitive thinking processes, while "propensity for learning" reflects the coach's ability and attitude in acquiring knowledge, serving as a resource channel for enhancing cognitive abilities. Therefore, this dimension is named "Cognitive Ability."

Dimension 2: Indicators such as training program development, player guidance, and motivation are highly relevant skills for tennis coaches, mainly reflected in the core job content specified by the responsibilities of daily training and competition processes. These corresponding abilities directly impact the outcomes of matches and training. Therefore, Dimension 2 is named "Professional Skills." Dimension 3: Indicators such as

coordination, problem-solving, communication skills, and influence, when analyzed in conjunction with coach interviews, mainly reflect the core competency characteristics required for team management by coaches. As the leader of the team, coaches must not only excel in training and competition but also excel in management. Thus,

Dimension 3 is named "Management Ability."

Dimension 4: Indicators such as achievement motivation, innovation, and emotional control belong to intrinsic motivations and psychological characteristics and habits of coaches in their pursuit of success. These can be categorized as psychological traits of coaches. Therefore, Dimension 4 is named "Personal Traits." In summary, the Competence Model for Chinese Tennis Coaches is proposed, with its dimensional structure and sub-indicator classification detailed in Figure 2.

Figure 2. Standardized Path Model of Competence Structure for Chinese Tennis Coaches
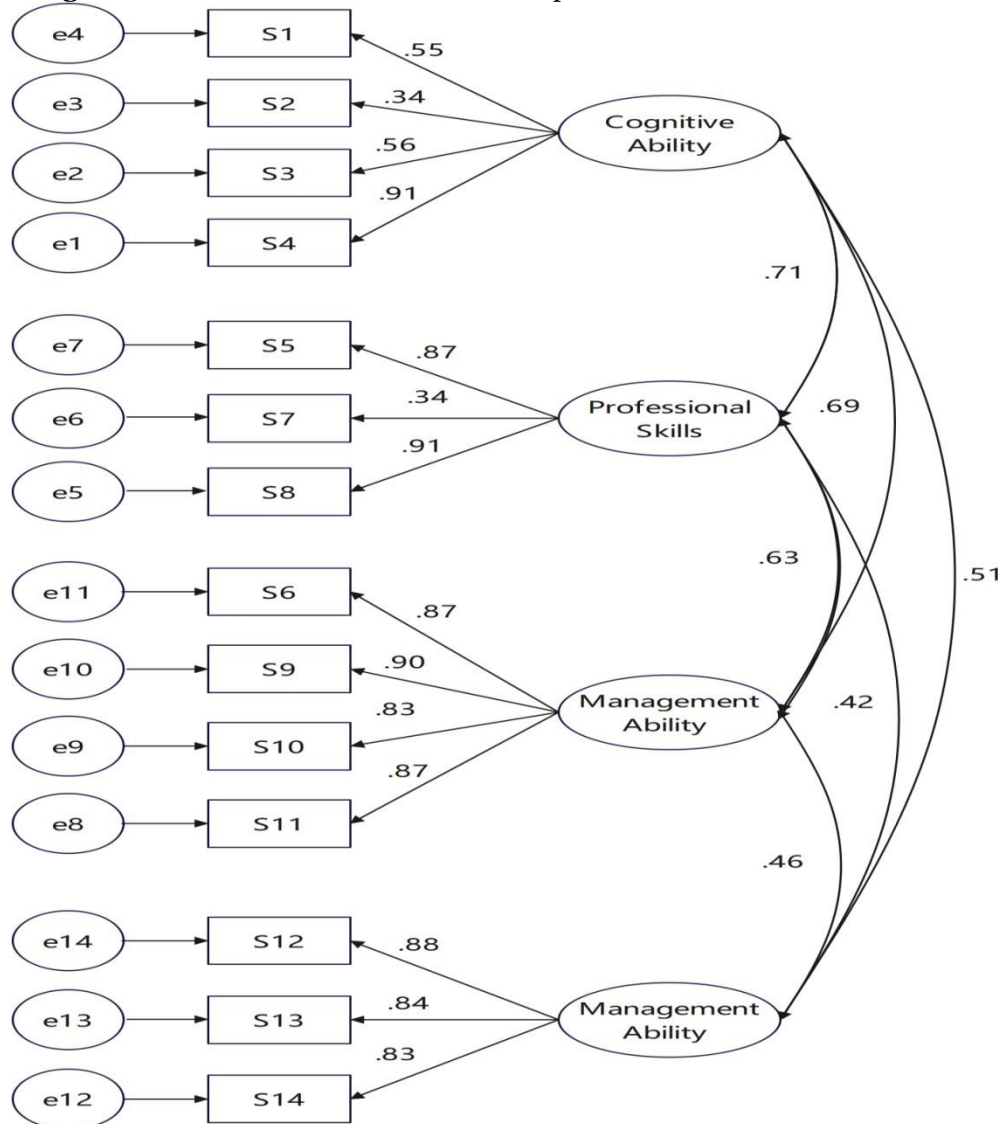
The path diagram of the model shows that the standardized regression coefficients of the observed variables of each latent factor are within an acceptable range. From the model, it is evident that the cognitive ability latent factor has the closest relationship with the two latent factors of professional skills and managerial abilities, with correlation coefficients of 0.71 and 0.69 respectively. The correlation coefficient between the latent factors of professional skills and managerial abilities is also relatively high, reaching 0.63. This indicates a close association between the cognitive ability of tennis coaches and their professional skills and managerial abilities. Coaches draw conclusions based on their cognitive abilities, thereby influencing their coaching behavior in practice. The correlation coefficients of each latent factor are shown in the table 10 below.

Table 10. List of inter-factor correlations

Factor Relationships	Unstandardized Coefficients	Standardized Coefficients	SE	CR	P

Cognitive Ability Professional Skills	<-->	2.096	0.713	0.260	8.070	**
Professional Skills Management Ability	<-->	1.731	0.631	0.224	7.719	**
Management Ability Personal Traits	<-->	1.669	0.462	0.220	7.592	**
Cognitive Ability Management Ability	<-->	1.636	0.688	0.216	7.578	**
Professional Skills Personal Traits	<-->	2.086	0.417	0.264	7.917	**
Cognitive Ability Personal Traits	<-->	2.015	0.513	0.255	7.911	**

Note: ** indicates P < 0.01.

The judgment of the data in Table 23 is important to note the significance of the t-values. When P < 0.01, it indicates that each common factor is independent of others, and there are no overlapping observed variables, demonstrating high discriminant validity among competency indicators. This further validates the measurement validity of competency characteristics.

3.4 Model Validation

This study employed various indicators for confirmatory factor analysis validation, including the chi-square test (χ^2), chi-square to degrees of freedom ratio (χ^2/df), adjusted goodness-of-fit index (AGFI), goodness-of-fit index (GFI), incremental fit index (IFI), Tucker-Lewis index (TLI), comparative fit index (CFI), and root mean square error of approximation (RMSEA) as evaluation criteria. The test results are presented in Table 11 below:

Table 11. Fit Indices of the Tennis Coach Competency Model Structure (N=82)

Test Indicators	X^2	df	X^2/df	AGFI	GFI	IFI	CFI	RMSEA
Test Values	359.166	186	1.931	0.872	0.924	0.923	0.918	0.069

A ratio of X^2 value to degrees of freedom (df) less than 2 indicates a good fit of the model; if the ratio of X^2 value to degrees of freedom (df) is between 2 and 5, the model is deemed acceptable. As shown in Table 11, the X^2/df ratio of the four-dimensional model is less than 2, indicating a good model fit. AGFI and GFI are absolute fit indices, with values above 0.85 and 0.90 respectively considered indicative of good model fit. As indicated in Table 24, both AGFI and GFI values of the four-dimensional model meet the criteria, demonstrating a good simulated fit of the model.

GFI, IFI, and CFI are relative fit indices, with values closer to 1 indicating better model fit. As shown in Table 24, GFI, IFI, and CFI values are all above 0.90, thus confirming excellent fit of the four-dimensional model.

RMSEA (Root Mean Square Error of Approximation) is an approximate error index, with the following interpretation: 0 indicates perfect fit, less than 0.05 indicates close fit, 0.05-0.08 indicates reasonable fit, 0.08-0.10 indicates mediocre fit, and greater than 0.10 indicates poor fit. Table 24 indicates that the RMSEA value of the four-dimensional model falls within the reasonable fit range.

Through confirmatory factor analysis testing and a comprehensive analysis of the above indicators, it is concluded that the indicators of the four-dimensional model of competencies for Chinese tennis coaches have reached a good level. Therefore, the four-dimensional model represents an ideal structure for tennis coach competencies, indicating that the competency model constructed in this study has been well validated.

3.5 Results and Analysis

3.5.1 Structural Analysis of the Competency Feature Model

According to the iceberg theory mentioned earlier, scholars metaphorically liken the competency feature model to an iceberg floating on the water . Based on the different manifestations of individual characteristics, it is divided into the visible part above the surface of the iceberg and the hidden part below the surface. The surface part includes basic knowledge and skills, which are relatively easy to understand and measure, and can be improved through training. The hidden part below the surface includes social roles, self-image, traits, and motivations. These characteristics are intrinsic to individuals, difficult to measure, and not easily changed, but they play a crucial role in individual behavior. In the competency feature model of tennis coaches, professional skills and management abilities are mainly reflected in the specific coaching behaviors during the coaching process, representing external observable individual characteristics. Personal trait dimensions mainly reflect the psychological qualities of excellent tennis coaches, representing internal latent characteristics. Cognitive

abilities refer to the coaches' concepts, values, and logical thinking based on individual knowledge, which are not just static knowledge systems. Therefore, cognitive ability dimensions should be considered internal latent characteristics. External observable characteristics are easily observable and directly influence the coaching performance of coaches, while internal latent characteristics play a crucial role in external observable characteristics and consequently have an important impact on the performance of tennis coaches. The factor analysis in the model construction process mentioned earlier also confirmed the close interrelationships among the four dimensions. Thus, the internal structure of the competency feature model of tennis coaches is illustrated in Figure 3 below:

Figure 3. Internal Structure Diagram of the Competency Feature Model of Tennis Coaches
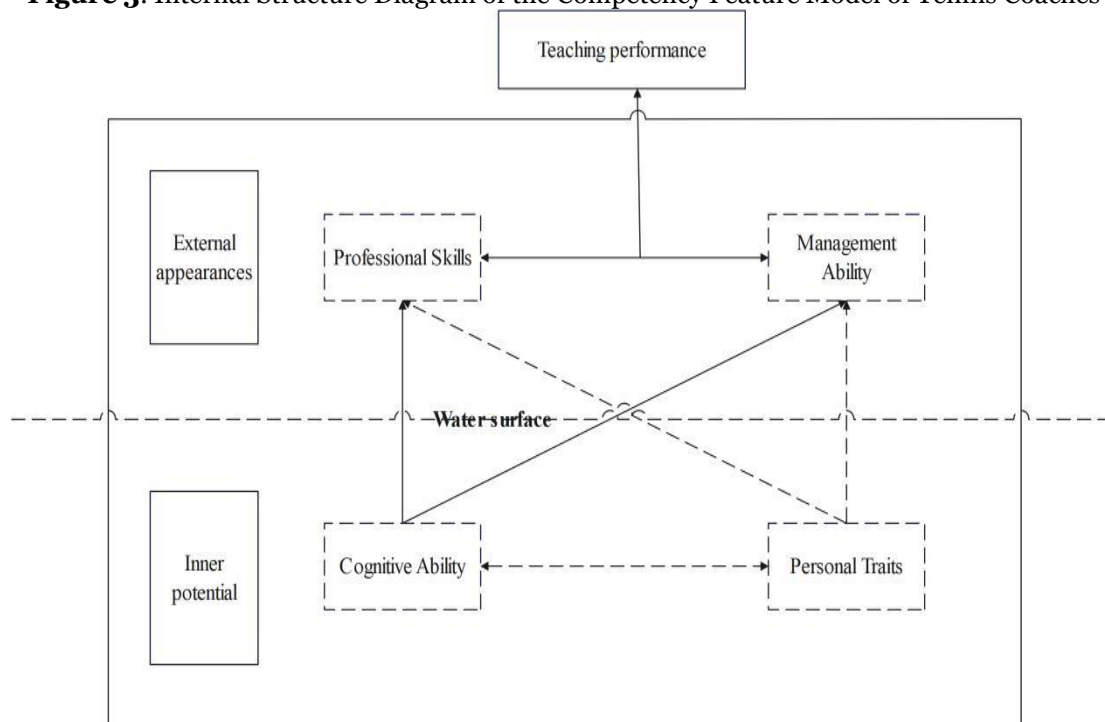
From the results of the previous factor analysis, it can be observed that the correlation coefficients between cognitive ability, professional skills, and managerial skills are all above 0.60, while the correlation coefficients between personal traits and these three dimensions range from 0.42 to 0.51. Compared to the closeness of the relationships between the first three dimensions, the relationship coefficient between personal traits and these three dimensions is relatively lower, but there is still a certain level of correlation. Personal traits can be regarded as an important foundation of the competency characteristics of tennis coaches and a necessary prerequisite for their success. Coaches who can maintain a high level of achievement motivation, set strict standards for themselves, consistently maintain stable and healthy emotions, and are willing to explore and innovate during coaching can naturally enhance their coaching abilities and increase their likelihood of success. Cognitive ability is one of the intrinsic motivations behind a coach's coaching behavior. Coaches make decisions through observation, analysis, and judgment, which manifest in outward behaviors such as professional skills and managerial abilities. They further enhance their cognitive abilities through feedback, reflection, and continuous learning. Professional skills and managerial abilities form a mutually reinforcing and complementary relationship in the process of coaching tennis. Together, they contribute to coaching performance, and neither can be lacking.

The paper adopted an expert discussion method to determine the weighting table of key competencies for tennis coaches. Experts were invited to rate the weighting of key competencies for tennis coaches, and after collecting their opinions, any discrepancies were addressed by conducting a second round of surveys using the same method until a consensus was reached.

Thirteen experts were selected for this consultation, with an average age of (40±5) years and an average of (20±5) years of work experience. Twelve valid questionnaires were ultimately collected, with an expert response rate of 92.3%. The weighting of key competencies for tennis coaches in Table 12 was determined through expert discussions.

Table 12. Weighting of Key Competencies for Tennis Coaches

Key Competency Dimensions	Key Competency Indicators	Weight
Cognitive Ability (20%)	Coaching Philosophy	20%
	Professional Experience	35%
	Analysis and Synthesis	30%
	Aptitude for Learning	15%
Professional Skills (35%)	Development of Training Plans	42%
	Player Guidance	36%
	Motivation	22%
	Communication Skills	32%
Management Skills (21%)	Influence	24%
	Coordination and Planning	18%
	Problem Solving	26%
	Achievement Motivation	35% 37%
Personal traits (24%)	Innovation	
	Emotional Control	28%

3.5.2 Discussion

This study is a cross-sectional study on the competency characteristics of tennis coaches. According to competency theory, due to the differences between the coaching profession and that of corporate employees, tennis coaches are classified into different levels based on the characteristics of their trainees (Qingdanning, 2023). Different levels of tennis coaches collectively form the Chinese tennis coach system, which is the main force in cultivating tennis talent in China (Zhang Hang & Wang Jiayin, 2022). Due to the similarity of sports projects, coaches at different levels inevitably share many competency characteristics. However, due to different actual work environments, there will also be certain differences in their competency characteristics (Chi Yong, 2022). Therefore, future research can focus on the longitudinal study of competency characteristics within the Chinese tennis coach system, establishing a competency characteristic model system for Chinese tennis coaches, and thus better applying competency research to the practical management of Chinese coaching human resources.

4. Conclusion

This study, through a combination of practical investigation and theoretical research, examines the competency characteristics of Chinese tennis coaches and draws the following conclusions:

A competency model for Chinese tennis coaches was developed. The model consists of 4 dimensions with a total of 14 competency indicators. Specifically, the cognitive ability dimension includes coaching philosophy, professional experience, analysis and synthesis, and aptitude for learning. The professional skill dimension comprises training plan development, player guidance, and motivation. The management ability dimension consists of communication skills, influence, coordination, and problem-solving. Personal traits include achievement motivation, innovation, and emotional control. Exploratory factor analysis and confirmatory factor analysis results show that the four-dimensional model performs well across various fitting indicators and has been well-validated.

A competency assessment scale for Chinese tennis coaches was developed, containing 36 measurement items that effectively reflect the work characteristics of Chinese tennis coaches and provide an operational measurement tool for assessing coach competency levels. Surveying Chinese tennis coaches' competency levels based on this scale reveals that scores in the four competency dimensions are ranked in descending order as follows: professional skills > personal traits > management ability > cognitive ability.

Based on the competency model constructed in this study, the application of the Chinese tennis coach competency model in coach selection is proposed, which can provide strong support for human resource management of Chinese tennis coaches.

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