

A COMPARATIVE STUDY OF YOUTH TABLE TENNIS TRAINING SYSTEMS IN CHINA AND KYRGYZSTAN

UM ESTUDO COMPARATIVO DOS SISTEMAS DE TREINAMENTO DE TÊNIS DE MESA PARA JOVENS NA CHINA E NO QUIRGUISTÃO

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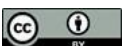
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Abstract

Youth training systems constitute the institutional backbone of elite sport development. In technically demanding sports such as table tennis, early talent identification, systematic training progression, and dense competition exposure are decisive for long-term performance outcomes. This study conducts a comparative analysis of youth table tennis training systems in China and Kyrgyzstan. Using a qualitative comparative case study design, the research analyzes policy documents, federation reports, and publicly available competition and development program materials through a six-dimension analytical framework: governance structure, talent identification, training organization, competition system, coach education, and support mechanisms. The results demonstrate that China operates a highly institutionalized, government-led, multi-tier youth training system characterized by dense competition pathways and structured talent pipelines. In contrast, Kyrgyzstan's system is primarily federation- and club-based, with substantial reliance on international development programs for coach education and capacity building. The study offers evidence-based policy recommendations for strengthening structural

Resumo

Os sistemas de formação de jovens constituem a espinha dorsal institucional do desenvolvimento do esporte de elite. Em esportes tecnicamente exigentes, como o tênis de mesa, a identificação precoce de talentos, a progressão sistemática do treinamento e a intensa exposição a competições são fatores decisivos para os resultados de desempenho a longo prazo. Este estudo realiza uma análise comparativa dos sistemas de formação de jovens no tênis de mesa na China e no Quirguistão. Utilizando um desenho de estudo de caso comparativo qualitativo, a pesquisa analisa documentos de políticas, relatórios de federações e materiais de competições e programas de desenvolvimento disponíveis ao público por meio de um quadro analítico de seis dimensões: estrutura de governança, identificação de talentos, organização do treinamento, sistema de competições, formação de treinadores e mecanismos de apoio. Os resultados demonstram que a China opera um sistema de treinamento juvenil altamente institucionalizado, liderado pelo governo e com múltiplos níveis, caracterizado por percursos de competição intensos e canais estruturados de talentos. Em contraste, o sistema do Quirguistão



coherence in emerging table tennis nations and optimizing system balance in established sport powers.

Keywords: Youth Sport Development. Table Tennis. Training System. Talent Development. Comparative Study. China. Kyrgyzstan.

é baseado principalmente em federações e clubes, com dependência substancial de programas internacionais de desenvolvimento para a formação de treinadores e capacitação. O estudo oferece recomendações de políticas baseadas em evidências para fortalecer a coerência estrutural em nações emergentes no tênis de mesa e otimizar o equilíbrio do sistema em potências esportivas estabelecidas.

Palavras-chave: Desenvolvimento do Esporte Juvenil. Tênis de Mesa. Sistema de Treinamento. Desenvolvimento de Talentos. Estudo Comparativo. China. Quirguistão.

1 INTRODUCTION

Youth sport development systems constitute the structural foundation of elite sport performance and long-term competitive sustainability. In high-skill, fast-decision sports such as table tennis, early exposure to systematic training, structured talent identification, and dense competitive environments are widely recognized as decisive factors shaping athletes' developmental trajectories (Balyi et al., 2013; De Bosscher et al., 2015). As a result, national youth training systems have become a central focus in comparative sport policy and talent development research.

From a sport development perspective, elite performance is not solely the product of individual talent or coaching expertise, but rather the outcome of complex interactions between governance structures, institutional arrangements, resource allocation, and competition pathways (Green & Oakley, 2001; Houlihan & Green, 2008). Countries that achieve sustained success in specific sports often exhibit highly institutionalized youth development systems, characterized by coherent governance, early talent identification, standardized training progression, and multi-level competition structures (De Bosscher et al., 2006).

Table tennis represents a paradigmatic case of a system-dependent sport. The sport requires exceptional perceptual–motor coordination, technical precision, tactical adaptability, and psychological resilience, most of which are developed through long-term, high-frequency practice under expert supervision (Zhang et al., 2018; Malagoli Lanzoni et al., 2014). Empirical studies indicate that elite table tennis athletes typically

begin structured training at an early age and progress through clearly defined developmental stages supported by national training and competition systems (Liu et al., 2020). Consequently, disparities in national youth training systems often translate directly into differences in international competitive outcomes.

China has dominated international table tennis for several decades, consistently producing world-class athletes across multiple generations. Scholars have attributed this dominance not only to technical proficiency, but more fundamentally to China's highly centralized and hierarchical youth training system, which integrates sports schools, provincial teams, national training bases, and a dense competition network (Tan & Bairner, 2010; Hong, 2011). Within this system, talent identification occurs early, training intensity is systematically increased, and competition exposure is continuous, creating a stable pipeline for elite athlete development.

In contrast, many emerging or developing table tennis nations face structural constraints in youth development, including limited financial resources, insufficient coaching capacity, fragmented competition systems, and weak institutional coordination (Houlihan & Green, 2008; De Bosscher et al., 2015). Kyrgyzstan represents such a context. As a post-Soviet, lower-middle-income country, Kyrgyzstan's sport system has undergone significant institutional transformation, with reduced state involvement and increased reliance on sport federations, clubs, and external support mechanisms (Riordan, 2007).

In recent years, international sport organizations what particularly the International Table Tennis Federation (ITTF) and Olympic Solidarity what have played an increasingly important role in supporting youth sport development in emerging nations. Through coach education programs, training camps, and grassroots participation initiatives, these organizations aim to strengthen local capacity and promote long-term sport development (Houlihan & Zheng, 2013). While such programs have demonstrated positive short-term effects, scholars caution that their sustainability depends on integration with domestic institutional structures and competition systems (De Bosscher et al., 2015).

Despite growing scholarly interest in talent development systems, existing research has predominantly focused on Western or economically advanced sporting nations, with limited attention to comparative analysis between highly institutionalized

sport powers and emerging sport systems within the same discipline (Green & Houlihan, 2005). Moreover, while table tennis is frequently examined from technical and biomechanical perspectives, systematic policy- and system-level comparisons of youth training structures remain underdeveloped in the literature.

Against this backdrop, a comparative examination of youth table tennis training systems in China and Kyrgyzstan offers both theoretical and practical significance. Theoretically, such a comparison contributes to the broader literature on comparative sport development by illuminating how differing governance models, resource endowments, and institutional arrangements shape athlete development outcomes. Practically, it provides evidence-based insights for policymakers, sport administrators, and federations seeking to strengthen youth training systems under varying structural conditions.

Therefore, this study aims to conduct a structured, system-level comparison of youth table tennis training systems in China and Kyrgyzstan using a multidimensional analytical framework. By examining governance structures, talent identification pathways, training organization, competition systems, coach education, and support mechanisms, the study seeks to identify key structural differences and extract policy-relevant lessons for both established and emerging table tennis nations.

1.1 Research questions and research objectives

1.1.1 Research Questions

To what extent do youth table tennis training systems in China and Kyrgyzstan differ in their level of institutionalization across governance, talent development, training organization, coach education, and support mechanisms?

- 1) How do differences in governance and competition structures affect the continuity and effectiveness of youth athlete development in China and Kyrgyzstan?
- 2) To what extent does system maturity influence the sustainability of youth table tennis training under different national development contexts?

1.1.2 Research objectives

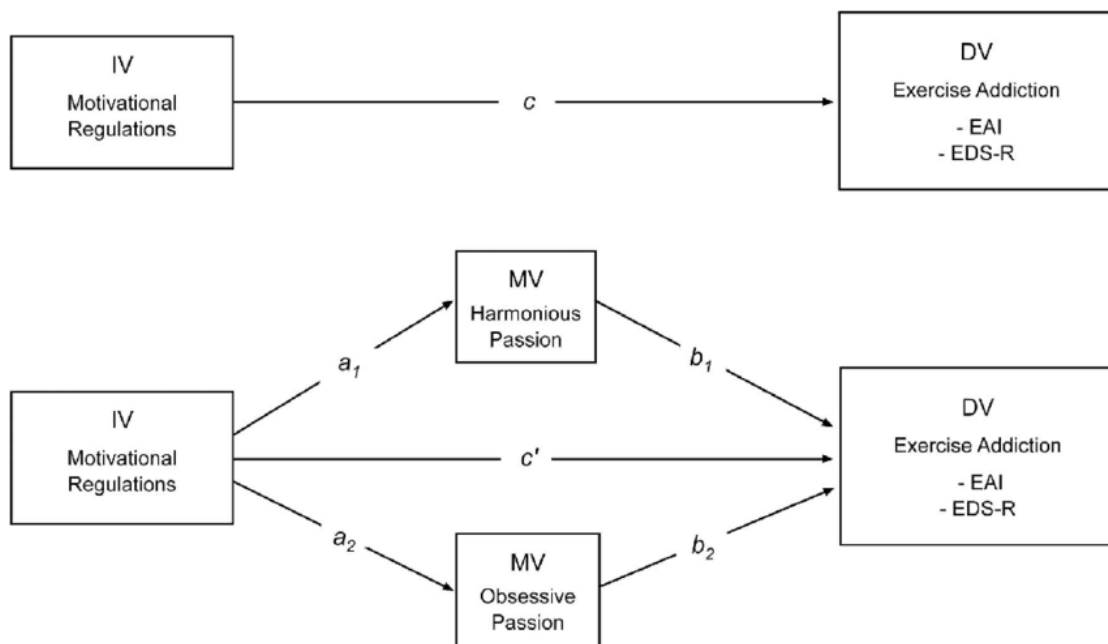
The objectives of this study are:

- 1) To assess the degree of institutionalization of youth table tennis training systems in China and Kyrgyzstan across key structural dimensions.
- 2) To examine the influence of governance and competition structures on the continuity and effectiveness of youth athlete development in the two national contexts.
- 3) To identify system-level implications for improving the sustainability of youth table tennis training systems under different stages of sport development.

1.2 Research framework

Table 1

Research Framework



2 LITERATURE REVIEW

2.1 Youth sport development systems

Youth sport development systems are commonly conceptualized as multi-layered structures integrating governance, resource allocation, talent identification, training progression, competition pathways, and support services. Comparative studies emphasize that centralized coordination and dense competition structures are strongly associated with sustained elite sport success (Green & Oakley, 2001; Houlihan & Green, 2008).

2.2 Talent development in table tennis

Table tennis requires early acquisition of technical skills, tactical awareness, and perceptual–motor coordination. Research indicates that elite table tennis players typically engage in structured training from a young age, supported by specialized coaching and frequent competition against comparable opponents (Zhang et al., 2018). Consequently, national youth training systems play a decisive role in shaping athlete trajectories.

2.3 Sport development in emerging nations

For developing sport nations, international federations often function as key drivers of capacity building. Programs focused on coach education, training camps, and grassroots participation can significantly enhance short-term development outcomes. However, without complementary domestic institutional structures, these initiatives may struggle to produce sustainable long-term impact (Houlihan & Green, 2008).

3 METHODOLOGY

3.1 Research design

A qualitative comparative case study design was employed, with China and Kyrgyzstan selected as contrasting cases representing a highly developed and an emerging table tennis system, respectively.

3.2 Analytical framework

The analysis was guided by a six-dimension framework commonly used in comparative sport policy research:

1. Governance structure and funding
2. Talent identification and selection
3. Training organization
4. Competition system
5. Coach education and certification
6. Support mechanisms (facilities, education, sport science)

3.3 Data sources

Data were collected from national policy documents, federation publications, international organization reports, and publicly available competition information. Sources were cross-checked to ensure reliability.

3.4 Data analysis

Qualitative content analysis was conducted to identify recurring institutional patterns. Cross-case synthesis was used to enhance analytical rigor.

4 RESULTS

This chapter presents the comparative results of youth table tennis training systems in China and Kyrgyzstan. Following the analytical framework outlined in the methodology, the results are organized into five sub-sections addressing governance structures, talent identification and training organization, competition systems, coach education and support mechanisms, and an integrated system-level comparison. Tables are used to summarize structural characteristics and facilitate cross-national comparison in accordance with APA reporting conventions.

4.1 Governance structure of youth table tennis training systems

The governance structure of youth table tennis training in China is characterized by a centralized and hierarchical model. National sport authorities formulate strategic objectives and development plans, while provincial and municipal sport bureaus are responsible for implementation through sports schools, training bases, and affiliated institutions. This top-down governance model enables stable funding allocation, long-term planning, and policy continuity.

In contrast, Kyrgyzstan's youth table tennis training system is predominantly administered by the national federation and local clubs. Direct governmental involvement is limited, and financial resources are often derived from short-term projects or external assistance. As a result, governance arrangements are more fragmented and less institutionalized.

Table 1

Analytical Framework for Comparing Youth Table Tennis Training Systems

Dimension	Analytical Focus
Governance structure	Leadership, policy orientation, funding sources
Talent identification	Selection criteria, pathways, age stages
Training organization	Institutional settings, training frequency
Competition system	Levels, density, progression routes
Coach education	Certification, continuing education
Support mechanisms	Facilities, education support, sport science

Note. The framework is adapted from comparative sport development literature.

Table 2*Comparison of Governance Structures in Youth Table Tennis*

Country	Dominant Model	Governance	Key Characteristics
China	Centralized, government-led		National planning with multi-level implementation
Kyrgyzstan	Federation-based	and club-	Decentralized and project-driven

The results indicate a clear contrast in governance models. China exhibits a high degree of institutional integration and policy coherence, while Kyrgyzstan relies on decentralized organizational arrangements with limited long-term policy coordination.

4.2 Talent identification and training organization

China employs a multi-stage talent identification system that begins at the grassroots level and progresses through sports schools, municipal teams, provincial teams, and national youth squads. Selection criteria are relatively standardized, and mobility between stages is supported by formal assessment and trial mechanisms. Training is typically delivered in specialized sports schools or training bases with full-time coaches and structured training schedules.

Kyrgyzstan's talent identification is primarily club-based and relies on coach observation and competition performance. Training is concentrated in urban clubs and training centers, with substantial variation in training frequency and quality due to uneven resource distribution.

Table 3*Talent Identification and Training Organization*

Dimension	China	Kyrgyzstan
Talent selection	Multi-stage national pathway	Club- and competition-based
Training institutions	Sports schools and training bases	Clubs and urban training centers
Training intensity	High and standardized	Variable

China's system demonstrates strong continuity across developmental stages, whereas Kyrgyzstan's pathway is less standardized, increasing the likelihood of talent loss during key transition periods.

4.3 Competition system and development pathways

China has established a dense, multi-tier youth competition system encompassing local, municipal, provincial, and national levels. Competitions are regularly scheduled and integrated into athlete selection and evaluation processes, providing consistent exposure to same-level and higher-level opponents.

In Kyrgyzstan, youth competitions are fewer in number and primarily concentrated in major cities. Competition structures are less stratified, and progression rules are often informal or discretionary, limiting systematic athlete advancement.

Table 4

Competition Density and Progression Logic

Aspect	China	Kyrgyzstan
Competition levels	Multi-tier national structure	Primarily city-level events
Annual frequency	High and calendarized	Low–moderate
Progression rules	Standardized	Less standardized
Competitive matching	Abundant same-level opponents	Limited opponent pool

The findings indicate that competition density is a critical structural advantage in China's system. Kyrgyzstan's limited competition network constrains tactical development and performance adaptation among youth athletes.

4.4 Coach education and support mechanisms

China maintains a domestic coach education and certification system integrated within its sport administration framework. Coaches typically progress through hierarchical certification levels and engage in continuing education activities. Support mechanisms include access to specialized facilities, sport science services, and educational coordination for student-athletes.

Kyrgyzstan's coach education relies heavily on externally supported programs, particularly international federation courses and training camps. While these initiatives enhance coaching knowledge, they are often short-term and project-based, limiting their institutional sustainability.

Table 5

Coach Education and Support Mechanisms

Dimension	China	Kyrgyzstan
Coach education	Domestic certification system	Internationally supported courses
Facilities	Extensive and specialized	Limited and urban-centered
Sport science	Integrated support services	Minimal

The results suggest that while Kyrgyzstan benefits from international coach education initiatives, the absence of a domestic certification system constrains long-term capacity building.

4.5 Integrated system-level comparison

To synthesize the comparative findings, overall system maturity was assessed across the six analytical dimensions.

Table 6

System Maturity Comparison of Youth Table Tennis Training

Dimension	China	Kyrgyzstan
Governance	High	Medium–Low
Talent identification	High	Low–Medium
Training organization	High	Medium
Competition system	High	Low–Medium
Coach education	High	Medium
Support mechanisms	High	Low–Medium

Note. Ratings are derived from qualitative synthesis of policy documents and organizational data.

China demonstrates consistently high system maturity across all dimensions, reflecting a well-integrated and institutionalized youth training system. Kyrgyzstan shows

moderate development in coach education and training organization but lower maturity in governance, competition, and support mechanisms.

4.6 Summary

This chapter compared youth table tennis training systems in China and Kyrgyzstan using a six-dimension analytical framework covering governance structure, talent identification, training organization, competition system, coach education, and support mechanisms (Table 1). Overall, the results demonstrate clear cross-national differences in institutionalization and system maturity.

First, in terms of governance, China reflects a centralized, government-led model with stronger policy coherence and multi-level implementation, whereas Kyrgyzstan relies more on federation- and club-based administration with comparatively fragmented coordination and more project-dependent resources (Table 2). Second, regarding talent identification and training organization, China exhibits a more standardized and continuous development pathway, supported by specialized training institutions and relatively stable training intensity. Kyrgyzstan, in contrast, shows greater variability in selection and training delivery due to uneven resource distribution and a less formalized national pipeline (Table 3).

Third, coach education and broader support mechanisms further differentiate the two systems. China maintains an integrated domestic coach development structure alongside more comprehensive facility provision and sport-science support. Kyrgyzstan demonstrates moderate capacity in coach development, largely supported through international and externally driven programs, but faces constraints in infrastructure and systematic support services (Table 4). Synthesizing across dimensions, the system maturity assessment indicates that China achieves consistently high maturity across all analytical areas, reflecting strong coupling among governance, training, and support components. Kyrgyzstan shows partial strengths—most notably in coach education and training organization—but lower maturity in governance and support mechanisms, suggesting that capacity-building initiatives are beneficial yet insufficient without broader institutional consolidation (Table 5).

In summary, the findings of this chapter establish that the primary differences between China and Kyrgyzstan lie in the degree of system integration, the stability of institutional arrangements, and the comprehensiveness of developmental supports. These results provide the empirical foundation for the critical discussion and targeted recommendations presented in Chapter 5.

5 CONCLUSIONS AND RECOMMENDATIONS

Based on the comparative results presented in Chapter 4, this chapter summarizes the main conclusions of the study and proposes practical recommendations for the improvement of youth table tennis training systems. The recommendations are organized into two levels: (a) short- to medium-term recommendations addressing current system constraints, and (b) long-term recommendations oriented toward sustainable system development. These suggestions are intended to provide policy-relevant guidance for sport administrators, federations, and educational institutions in both China and Kyrgyzstan.

5.1 Conclusions

This study conducted a systematic comparison of youth table tennis training systems in China and Kyrgyzstan using a six-dimension analytical framework encompassing governance structure, talent identification, training organization, competition system, coach education, and support mechanisms. The findings indicate that the two countries differ substantially in terms of institutional integration, resource allocation, and system maturity.

China's youth table tennis training system demonstrates a high level of institutionalization and internal coherence. Governance responsibilities are clearly defined, talent identification and training pathways are relatively standardized, and competition systems are dense and multi-tiered. These features collectively contribute to a stable and continuous development environment for young athletes. The integration of coach education, training institutions, and support mechanisms further reinforces the effectiveness of the system.

In contrast, Kyrgyzstan's youth table tennis training system is characterized by a lower degree of institutional consolidation. While the federation- and club-based model allows for flexibility and localized initiative, it also results in fragmented governance coordination, uneven training provision, and limited competition density. Coach education represents a relative strength due to the involvement of international development programs; however, the absence of a comprehensive domestic support structure constrains the long-term sustainability of these efforts.

Overall, the comparative evidence suggests that differences in youth athlete development outcomes are closely linked to system-level characteristics rather than isolated training practices. In particular, governance coherence, standardized development pathways, and competition structure emerge as decisive factors shaping the effectiveness of youth training systems.

5.2 Recommendations for current practice

5.2.1 Recommendations for Kyrgyzstan

In the short to medium term, Kyrgyzstan should prioritize strengthening the structural foundations of its youth table tennis training system.

First, greater institutional coordination is needed between the national federation, clubs, and educational institutions. Establishing clearer governance roles and communication mechanisms would enhance policy coherence and reduce fragmentation in training delivery.

Second, a more structured national talent identification and development pathway should be developed. While maintaining club-based flexibility, basic standards for athlete selection, age-group progression, and training benchmarks could improve continuity and reduce talent attrition.

Third, competition opportunities for youth athletes should be expanded and systematized. Increasing the frequency and geographic coverage of age-group competitions would provide more consistent performance feedback and support skill development.

Finally, international coach education programs should be strategically integrated into domestic development plans. Rather than functioning as stand-alone initiatives, these programs should contribute to the gradual establishment of a localized coach certification and mentoring system.

5.2.2 Recommendations for China

For China, current challenges relate less to system construction and more to system optimization.

First, continued attention should be given to balancing athletic training and academic education. Strengthening coordination between sports institutions and schools can help ensure sustainable athlete development and broader post-sport career opportunities.

Second, efforts should be made to reduce regional disparities in youth training resources. Enhancing support for less-developed regions would improve equity and expand the national talent pool.

Third, the role of social clubs and community-based programs should be further integrated into the existing system. Encouraging diversified participation pathways may enhance grassroots engagement while complementing the traditional sports school model.

5.3 Recommendations for future development

From a long-term perspective, both countries may benefit from adopting a more holistic and adaptive approach to youth sport development.

For Kyrgyzstan, future development should focus on building a stable, nationally coordinated youth training framework that gradually reduces reliance on external assistance. This includes institutionalizing competition structures, developing domestic coaching expertise, and securing sustainable funding mechanisms.

For China, future reforms should emphasize system resilience and adaptability. As social, educational, and technological contexts evolve, continuous evaluation of training intensity, athlete well-being, and developmental outcomes will be essential to maintaining long-term success.

At a broader level, both countries could benefit from enhanced international cooperation and comparative learning. Exchange programs, joint training camps, and collaborative research initiatives may provide valuable opportunities to share best practices and innovate youth training methodologies.

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Authors' Contribution

All authors contributed equally to the development of this article.

Data availability

All datasets relevant to this study's findings are fully available within the article.

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