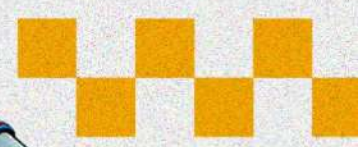
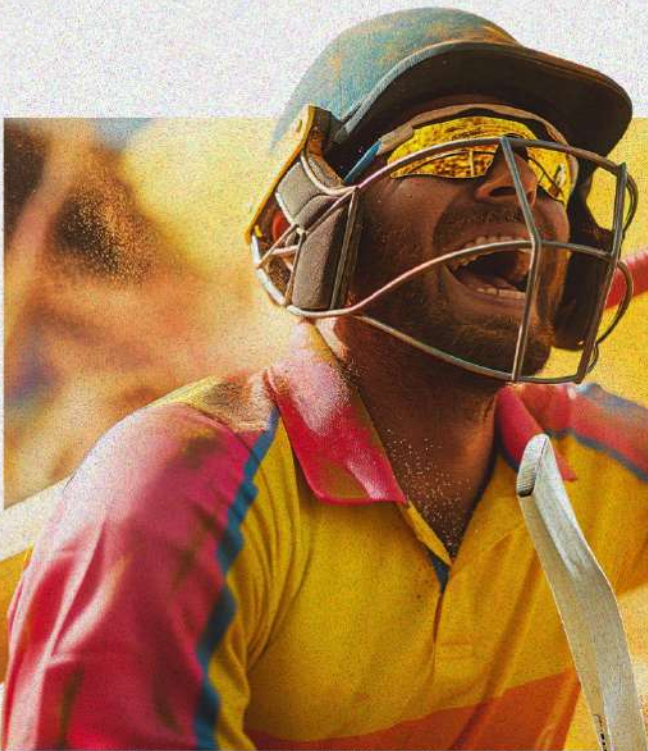




From Campus to

Commonwealth Games 2030 & Olympics 2036:

Transforming India's University Sports
Ecosystem (CWG 2030 – Olympic 2036)





EXECUTIVE SUMMARY

This report offers a thorough evaluation and reform-focused analysis of India's sports ecosystem, emphasizing universities' contributions to maintaining elite athletic success, boosting widespread involvement, building a skilled workforce, and spurring economic expansion. Even with increasing public funding, Khelo India-led infrastructure growth, and a booming sports sector, the system lags due to minimal public engagement (around 5–6%), disjointed oversight, poor connections between schools, universities, and federations, inadequate incorporation of sports science, and persistent shortages of qualified personnel. Experiences like the 2010 Delhi Commonwealth Games reveal that infrastructure built around major events, absent robust athlete pathways and cross-institutional collaboration, yields few enduring benefits. The Khelo India University Games (KIUG) showcase universities' promise as evident in top performers alongside major shortcomings, such as uneven competitor standards, flawed talent pipelines, and competing administrative structures.

The analysis pinpoints five linked systemic barriers: (i) disjointed data frameworks that hinder long-term athlete monitoring and data-driven decisions; (ii) gaps in skills and job readiness, including poor salaries, unclear career tracks, and underuse of sports experts; (iii) shortfalls in facilities, where sheer volume exceeds effective use, upkeep, and tech integration; (iv) breakdowns in governance and collaboration amid entities with duplicative roles; and (v) funding and reward structures that prompt talent to leave the country. Benchmarks from the United States, Australia, China, and the United Kingdom show that top-tier results stem more from cohesive systems as merging data tools, talent pools, organizational synergy, and ongoing athlete backing, than from facility abundance alone.

Building on the National Sports Policy 2025 and National Sports Governance Act 2025, the report outlines a clear reform framework via a hub-and-spoke model. Core proposals encompass launching the National Sports Repository System with analytics centered at NIS Patiala; scaling up standardized university sports programs through accredited hubs and NCSECB standards; advancing career professionalism with fair wages, transferable perks, and clear advancement routes; tying infrastructure spending to usage and impact; weaving sports into education and health frameworks; and deploying measures to keep and bring back expert talent. By treating the 2030 Commonwealth Games and possible 2036 Olympics as drivers of lasting change not mere milestones. India can harness its young population, market potential, and policy drive to forge a resilient, participatory, and value-generating sports landscape.



DEMAND

The Rising Imperative for a Robust Sports Ecosystem in India

India's demand for a structured and professional sports ecosystem is being driven by deep demographic and social shifts rather than short-term sporting success. With over two-thirds of the population below 35 years of age and a rapidly expanding school and university enrolment base, organised sport is increasingly viewed as a pathway for education, health, and employment. While an estimated 80–90 million young people engage in some form of sport annually, fewer than 10% have access to structured training, certified coaching, or progression pathways. This mismatch has created a strong latent demand for institutionalised sports systems that extend beyond elite performance and support sustained participation across age groups, genders, and regions.

At the elite level, India's growing ambition to improve its performance at the Commonwealth Games and Olympic Games has intensified demand for scientifically driven athlete development systems. International benchmarks suggest that consistent podium performance requires a wide base of high-performance athletes supported by long-term training, exposure, and recovery mechanisms. India currently produces only a few hundred athletes annually who meet international performance standards across Olympic disciplines, a number insufficient to sustain competitive depth. This gap has increased demand for high-performance centres, structured competition calendars, international exposure, and integrated sports science support within the domestic ecosystem.

Demand has also expanded sharply for skilled human resources across coaching, officiating, sports science, and administration. Based on participation levels and global coach-to-athlete benchmarks, India requires well over one million trained coaches and several hundred thousand officials and support professionals to meet current and projected needs. The National Sports Policy explicitly recognises sport as a contributor to education, public health, and employment, which further increases demand for trained personnel capable of delivering quality sport at scale. Without a corresponding expansion in professional capacity, rising participation and investment will not translate into performance, retention, or economic impact.

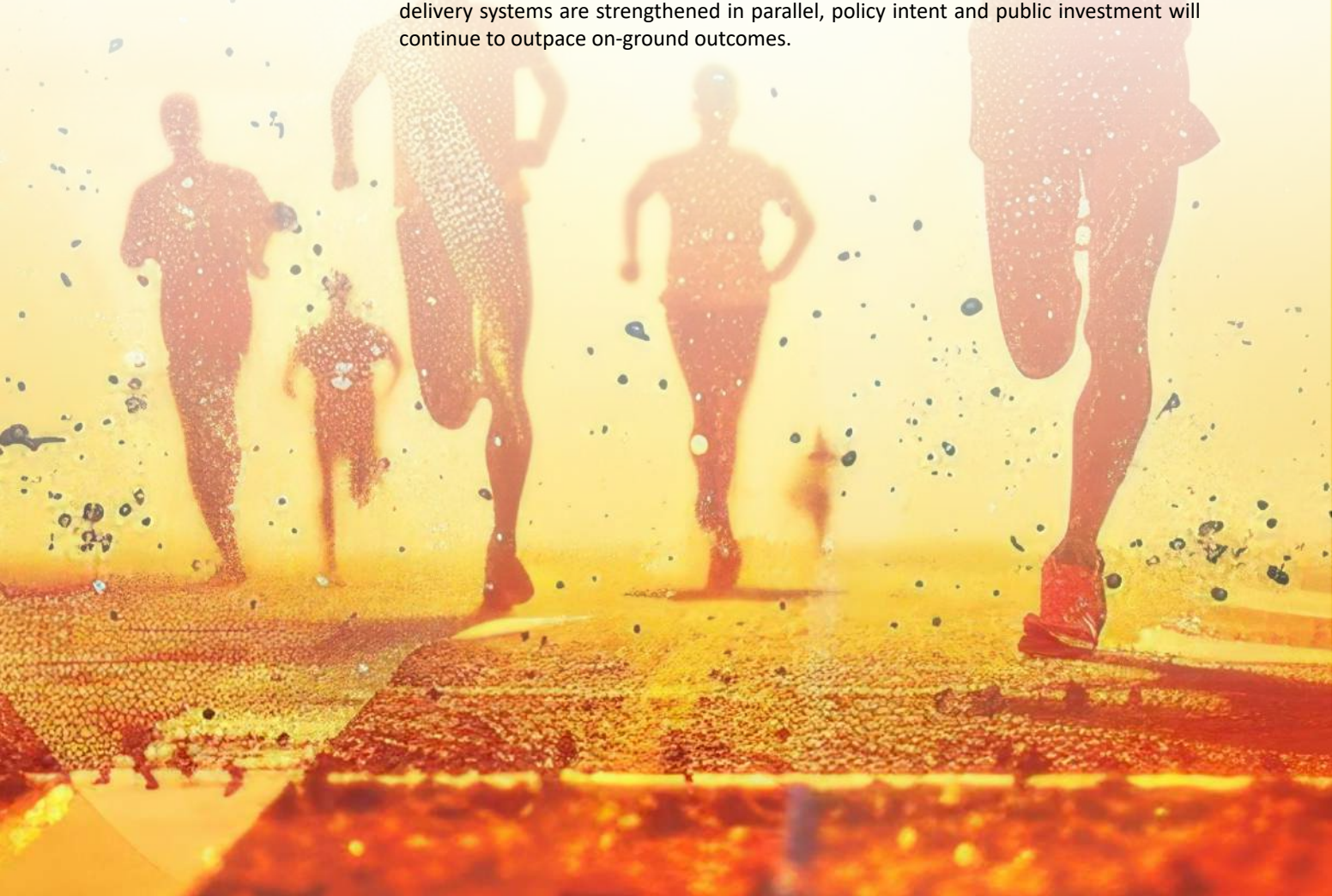


Structural Gaps and Capacity Constraints in India's Sports Ecosystem

Despite rising demand, the supply side of India's sports ecosystem remains fragmented and capacity constrained. While public investment in sports infrastructure has increased significantly over the past decade, the availability of functional, accessible, and well-maintained facilities remains limited. A substantial proportion of existing infrastructure is concentrated in a few urban centres, with many district- and block-level facilities either underutilised or inadequately maintained. International experience shows that infrastructure alone does not drive outcomes; however, insufficient and uneven supply directly restricts participation, limits talent identification, and reinforces regional disparities.

The supply of qualified coaches and technical personnel represents one of the most acute constraints. India produces only a fraction of the coaches required annually to meet system-wide needs, and many existing practitioners lack access to continuous professional development or exposure to modern training methodologies. Compensation levels remain low and career pathways poorly defined, discouraging skilled professionals from entering or remaining in the sector. As a result, coaching quality varies widely, and athletes frequently progress through critical developmental stages without appropriate technical guidance, increasing dropout and injury risks.

Sports science, medical support, and governance capacity are similarly under-supplied. Access to physiotherapy, strength and conditioning, psychology, nutrition, and performance analytics remains largely confined to elite national centres, leaving the majority of athletes without systematic support. Administrative and governance capacity across federations, universities, and state bodies is uneven, limiting effective planning, monitoring, and utilisation of funds. Although the National Sports Policy provides a coherent strategic framework, its implementation is constrained by these supply-side gaps. Unless institutional capacity, workforce availability, and service delivery systems are strengthened in parallel, policy intent and public investment will continue to outpace on-ground outcomes.





Foreword

Rajpal Singh

Director-General, Confederation of Sports and Recreation Industry

India stands at a defining moment in its sporting history. As the recently announced host of the 2030 Commonwealth Games and an aspirant to host the 2036 Olympic Games, we have both the opportunity and the responsibility to fundamentally reimagine its sports ecosystem. Hosting the Olympic Games is not merely an event-led ambition; it is a test of institutional capacity, policy coherence, human capital, and long-term vision.

Over the past two decades, India's sporting landscape has expanded rapidly. The emergences of multiple franchise-based leagues increased private investment, and growing public engagement have positioned India as one of the world's fastest-growing sports markets. However, ambition alone does not translate into excellence. There remains a critical gap between India's aspirations as a global sporting nation and the effectiveness of policy execution, governance alignment, and talent development pathways. Despite improved performances at the Asian Games, Commonwealth Games, and the Olympic Games, India cannot still be defined as a major player as we are yet to touch double digits in a single Olympic edition.

Government initiatives such as Khelo India have made meaningful contributions by expanding grassroots participation and broadening the talent base. However, for India to credibly position itself as a future Olympic host and sporting powerhouse, these initiatives must be integrated into a unified national sports strategy. A coordinated approach by bringing together government, federations, the private sector, educational institutions, and athletes is essential to convert participation into podium performance.

CSRI is pleased to collaborate with Nangia Global in presenting this report, which addresses several foundational challenges within India's sports ecosystem. Of particular importance is the report's focus on employment generation and sports education, two pillars that will determine whether India can build a sustainable, knowledge-driven sports industry in the lead-up to 2036. The report highlights a significant disparity between students pursuing sports education in India and those opting to study abroad, with the latter currently outnumbering the former. This trend has resulted in a persistent talent outflow, depriving the domestic ecosystem of skilled professionals who could otherwise contribute to coaching, administration, sports science, governance, and policy formulation.

If unaddressed, this gap will impose both economic and competitive costs. A successful Olympic bid and legacy demand not only world-class venues, but also a deep pool of trained professionals capable of managing, regulating, and advancing the sports sector over the long term. Retaining and nurturing domestic talent must therefore be treated as a strategic priority.

CSRI is proud to contribute to this report, which we believe arrives at a critical time in India's sporting journey. We hope it serves as a policy reference point for the Government, sports federations, athletes, investors, and sports education institutions as they collectively shape a roadmap towards 2036.

Foreword



Suraj Nangia

Managing Partner – Nangia Global

The growth of India's sports sector reflects a broader transformation underway across the country— one in which sport is increasingly recognised not only as a source of national pride, but as a strategic driver of social inclusion, public health, youth engagement, and economic opportunity. As India's sports ecosystem evolves, it stands at a critical juncture where rising participation, expanding ambition, and heightening global visibility must be matched by institutional capacity, professional systems, and long-term planning.

It is in this context that Nangia Global, in partnership with CSRI, presents this report. The objective of this study is to provide a structured and evidence-based assessment of India's sports ecosystem, examining both the forces driving demand and the constraints shaping supply. While India has recorded notable successes at recent international sporting events and has strengthened its policy commitment through initiatives such as Khelo India and the Target Olympic Podium Scheme, these achievements coexist with persistent structural gaps in infrastructure, workforce capacity, and service delivery. This report seeks to move beyond celebration to offer a balanced analysis of progress, challenges, and priorities.

The report maps key trends influencing the future of sport in India, including rising grassroots participation, increasing private and public investment, and the growing role of technology in training, performance analysis, and fan engagement. It also highlights the expanding participation of women in competitive sport, reflecting gradual but meaningful shifts in access, visibility, and opportunity. Together, these trends

signal a maturing ecosystem, while also underscoring the need for coordinated interventions to ensure that growth is inclusive, sustainable, and outcome oriented.

Sustainability and governance form a central lens of this analysis. As India scales its sports infrastructure and event footprint, the integration of environmentally responsible practices and professional management systems becomes essential. The report outlines practical considerations for aligning sports development with environmental stewardship, efficient resource utilisation, and institutional accountability— elements that are critical to maximising the long-term impact of investment in the sector.

As Managing Partner of Nangia Global, I am pleased to present this report as a resource for policymakers, sports administrators, educational institutions, and industry stakeholders. It is our hope that the insights contained herein will support informed decision-making, encourage collaboration, and contribute to the development of a resilient, inclusive, and globally competitive sports ecosystem. With sustained commitment and strategic alignment, India has the opportunity not only to enhance sporting performance, but to position sport as a pillar of national development.

Foreword



Ahetesham Khan

Executive Director – Nangia Global

Sport today extends far beyond the realm of competition. It has emerged as a critical enabler of economic growth, social cohesion, youth development, and national identity. In India, the sports sector is undergoing a meaningful transition—characterised by rising participation, increasing professionalisation, and heightened global visibility. This moment represents both an opportunity and a responsibility: to ensure that ambition on the field is supported by strong systems, inclusive access, and sustainable institutional capacity.

This report, jointly prepared by Nangia Global and CSRI, seeks to examine India's sports ecosystem through a comprehensive and evidence-based lens. While recent years have seen notable achievements at international sporting events and expanding grassroots engagement, these successes coexist with structural challenges related to infrastructure distribution, workforce capacity, and governance. The report therefore moves beyond headline performance to analyse the underlying demand drivers and supply constraints shaping the sector's present and future.

The analysis is structured around key themes influencing the trajectory of Indian sport, including international competitiveness, grassroots development, gender inclusion, and technological integration. Government initiatives such as Khelo India and the Target Olympic Podium Scheme have played an important role in strengthening talent identification and athlete support, while the growing participation and visibility of women athletes reflects gradual progress toward a more inclusive ecosystem.

The report also examines the expanding role of technology—from data analytics to performance monitoring—in reshaping training systems and audience engagement.

Economic growth remains a defining feature of the sector, supported by the success of professional leagues, increased media interest, and rising private investment. At the same time, emerging segments such as e-sports and fantasy sports are redefining engagement patterns, particularly among younger audiences. These developments bring new opportunities, but also raise important questions around regulation, sustainability, and long-term value creation. The report highlights the importance of environmentally responsible practices and efficient resource use as India scales its sporting infrastructure and event footprint.

As the ecosystem matures, collaboration between public institutions and private stakeholders will be essential. Public-private partnerships have the potential to strengthen infrastructure delivery, professional management, and financial sustainability, provided they are guided by clear objectives and accountability frameworks. By aligning policy intent with institutional capacity and investment, India can build a sports ecosystem that is competitive, inclusive, and resilient.

This report is intended as both a diagnostic and a guide. It invites policymakers, sports administrators, educational institutions, and industry leaders to engage with its findings and contribute to a shared vision for the future of Indian sport—one that balances performance excellence with participation, innovation with equity, and growth with sustainability.

Year	2026	
Authors	Government and Public Sector Advisory, Nangia Global	
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<div style="display: flex; justify-content: space-between;"> Nangia Global Confederation of Sports and Recreation Industry </div>		
<p>Special thanks for contributing to the preparation of this knowledge paper</p>	 <p>Ahetesham Khan Executive Director (Government and Public Sector Advisory)</p>	 <p>Rajpal Singh Director - General</p>
	<div style="display: flex; justify-content: space-around;">   </div> <p>Monalika Jayani Aashita Jain</p> <p>Special thanks to the in-house team of Nangia Global (Monalika Jayani, Aashita Jain) for their efforts and Contribution to this report</p>	 <p>Ved Kaur</p>  <p>Shakya Mitra</p>

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01

India's Sports Ecosystem: A Situational Diagnosis

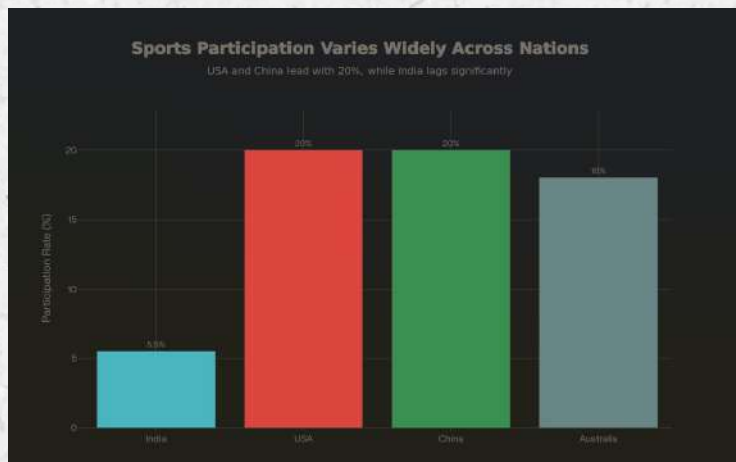
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India's Sports Ecosystem: A Situational Diagnosis

1.1. Overview of India's Sports Landscape: Participation, Performance, and Institutional Framework

India's sports system presents a paradoxical landscape: characterized by growing financial investment, rising global sporting ambition, and expanding fan engagement, yet simultaneously constrained by chronically low mass participation, fragmented institutional governance, and systemic capacity gaps that prevent conversion of investment into elite athlete development outcomes.

India's sports participation rate remains alarmingly low at 5 - 6% of the population regularly engaging in formal sports activities, a figure substantially below peer developing and developed nations (Government of India Ministry of Youth Affairs and Sports, 2025). This baseline participation constraint directly undermines talent identification and development pipelines: nations with 18 - 25% participation rates (such as the United States, China, and Australia) generate proportionally larger populations of athletically engaged youth from which elite talent emerges. This participation deficit is particularly acute in rural areas and among female populations: 76.3% of adolescent girls remain physically inactive compared to 71.8% of boys, and 38% of urban residents do not meet World Health Organization physical activity recommendations (Ministry of Youth Affairs and Sports / The Sports Society of India, 2022).

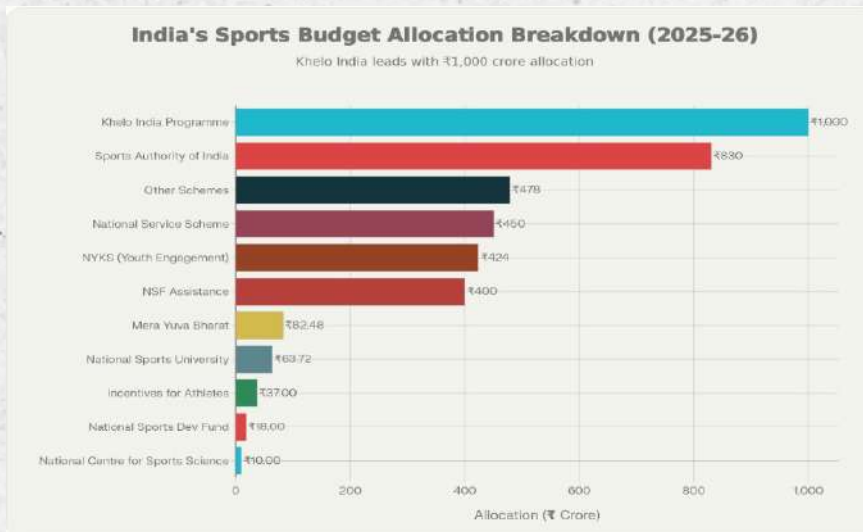


Source: Global Sports Participation Rates: India vs Peer Nations (Percentage of Population)

Paradoxically, India's sports fan base has expanded to 655 million individuals, representing approximately 50% of the national population—demonstrating substantial latent appetite for sporting engagement (Deloitte & Google, 2024). This fanbase is increasingly young (43% Gen Z), gender-diverse (36% women), and geographically distributed (59% rural residents), presenting untapped potential for grassroots participation conversion.

The Indian government's commitment to sports development is demonstrably increasing through budget allocations. The Union Budget 2025–26 allocated ₹3,794.30 crore to the Ministry of Youth Affairs and Sports, representing a 130.9% increase from ₹1,643 crore in 2014–15 (Government of India, 2025). The flagship Khelo India Programme received ₹1,000 crore (up from ₹800 crore in 2024–25), with 326 new sports infrastructure projects approved at ₹3,124.12 crore and 1,045 Khelo India Centres operational nationwide for grassroots training support (Government of India Ministry of Youth Affairs and Sports, 2025).

Yet despite these investments, utilization rates remain suboptimal: audits of Khelo India schemes reveal that fund utilization in athletics remains below 50% due to administrative delays and capacity constraints (Sports Authority of India, 2024).



Source: India's Ministry of Youth Affairs and Sports Budget Allocation 2025-26 (₹ Crores)

India's sports market exhibits explosive growth potential, projected to reach \$130 billion by 2030, up from current valuations of \$52.9 billion by 2033, with potential creation of 10.5 million employment opportunities and ₹21 billion in indirect tax revenue annually (Deloitte & Google, 2024). However, this market expansion remains concentrated in cricket and select elite sports rather than distributed across the sports ecosystem, limiting broader participation conversion.

1.2. Sports Universities and Federations in India: Roles, Limitations, and Governance Structures

India's university sports governance operates through the Association of Indian Universities (AIU), which received formal National Sports Promotion Organization (NSPO) status in 2008, positioning university sports institutionally on par with National Sports Federations in the policy hierarchy (Association of Indian Universities). This status recognizes universities as "Priority Category of Sport" entities for Olympic sport promotion, yet this formal recognition remains operationally underutilized. AIU coordinates 206 sporting events across All-India and zonal formats through the National University Games and the Khelo India University Games (KIUG), which represents the primary institutionalized pathway connecting campus athletics to elite development (Association of Indian Universities).

The Khelo India University Games 2025 witnessed participation from over 200 universities and more than 5,000 athletes competing across 23 sports disciplines. Chandigarh University topped the medal tally with 41 gold medals, underlining how targeted investment in campus sports infrastructure and athlete support can translate into competitive success. However, overall participation trends exposed deeper structural weaknesses. Media reports highlighted extremely low turnout in certain athletics events, including instances of single-athlete participation, pointing to gaps in athlete identification, preparation, and prioritization across most Indian universities.

India's sports governance operates through a dual framework comprising autonomous sports bodies led by the Indian Olympic Association (IOA) and National Sports Federations (NSF) alongside government institutions such as the Ministry of Youth Affairs and Sports and the Sports Authority of India, which provide policy direction and funding.

Historically, universities functioned outside this ecosystem, leading to parallel talent pipelines, duplication of effort, and inefficient resource use.

The National Sports Governance Bill 2025 seeks to address these long-standing governance challenges by mandating clear organizational hierarchies, fixed term and age limits for office-bearers, enhanced athlete representation, transparent financial practices, and the establishment of an independent National Sports Tribunal. While these reforms promise greater accountability and professionalism, their effectiveness will ultimately depend on consistent implementation across states, sustained funding, and meaningful inclusion of athletes in decision-making processes.

1.3. Why Mega-Events Expose Rather Than Fix Systemic Weaknesses

Mega-sporting events often act as institutional stress tests, exposing deep structural weaknesses while temporarily concealing them through short-term funding and infrastructure surges. In India, this event-centric model evident during the Delhi 2010 Commonwealth Games has repeatedly led to post-event infrastructure decay, withdrawal of athlete support, and limited long-term capacity building when broader ecosystem reform is absent. While host nations typically record a 10–20% medal boost, this “host advantage” materializes only when robust athlete development systems can convert opportunity into performance.

India’s Paris 2024 outcomes illustrate this gap. Despite sending a record 117 athletes, the country secured only six medals, with just 43% of finalists converting appearances into podium finishes well below the 60%+ conversion rates achieved in 2012 and 2020. This underlines that infrastructure spending without deep athlete preparedness does not guarantee results. With Ahmedabad confirmed as host of the 2030 Commonwealth Games, India faces compressed timelines: infrastructure completion alone may consume three to five years, leaving limited scope for quality athlete integration across 15–17 sports, including para-sports. Experiences from Birmingham 2022 further show that even strong state backing cannot compensate for weak grassroots pipelines.

Yet mega-events can function as strategic catalysts. CWG 2030 and a potential Olympics 2036 must be leveraged as forcing mechanisms for systemic reform integrating universities with federations, elevating campus sport to elite pathways, standardizing coaching, embedding sports science, and formalizing long-term athlete development so that hosting delivers sustainable transformation rather than costly, incremental gains.



02

Sports Infrastructure: Capacity vs. Capability



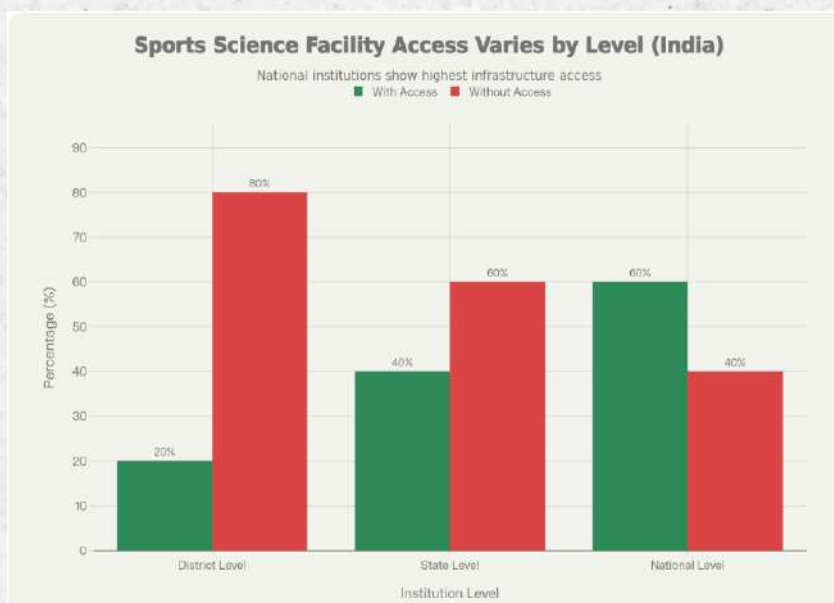
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Sports Infrastructure: Capacity vs. Capability

2.1. Status of Sports Infrastructure in India

The Khelo India University Games (KIUG) 2025 saw participation from over 200 universities and more than 5,000 athletes across 23 sports disciplines, signalling a broadening footprint of university-level competition in India (Olympics.com, 2025). Chandigarh University emerged as the overall champion with 41 gold medals, demonstrating that sustained institutional investment in sports infrastructure, coaching, and athlete support can deliver measurable competitive outcomes (PR Newswire, 2025). However, participation quality varied significantly across institutions. Media coverage highlighted scant turnout in athletics events, including instances of single-athlete participation, pointing to systemic deficiencies in talent identification, preparation, and prioritisation across much of the university system (New Indian Express, 2025).

These disparities are closely linked to structural coordination challenges within India's sports governance framework. The system operates under a dual model, wherein autonomous sports bodies led by the Indian Olympic Association and National Sports Federations function alongside government agencies such as the Ministry of Youth Affairs and Sports and the Sports Authority of India (Law Bhoomi, 2025). Universities have historically operated parallel to federation pathways, resulting in fragmented talent development and inefficient resource use. The National Sports Governance Bill 2025, approved by the Union Cabinet, seeks to address these long-standing issues through defined federation hierarchies, term and age limits for office-bearers, mandatory athlete representation, transparent governance committees, and the establishment of an independent National Sports Tribunal. While these reforms mark a significant step forward, their impact will depend on consistent implementation across 28 states and 8 union territories, each with varying administrative capacity (Vidhi Legal Policy, 2025; CLEAR IAS, 2025; Nandan Kamath, 2025).



Source: Sports Science Infrastructure Access Disparity Across India's Training Systems

Khelo India Infrastructure Status (as of 2025):

- Khelo India Centres: 1,045 operational
- Khelo India State Centres of Excellence: 34 notified
- Approved new projects: 326 (₹3,124.12 crore)
- Approved total infrastructure investment 2014–25: Substantial, yet utilization rates below optimal

The concentration of world-class infrastructure in select cities (Amdavad, Bhubaneswar, Chennai, Delhi) creates a "hub-and-spoke" model where elite athletes concentrate geographically, leaving regional and rural infrastructure underutilized and creating barriers for non-metropolitan talent identification (Grant Thornton Bharat, 2024).

2.2. Limitations in Training Quality, Sports Science Integration, and Technology Access

Although the quantity of sports infrastructure in India has improved, training quality and integration of sports science remain uneven and insufficient for elite development. A 2024 Sports Authority of India assessment indicates stark disparities in access to sports science: district-level training centres report only 20% access, compared to 60% at national centres, creating a 40-percentage-point quality gap between grassroots and elite athletes (The Sportz Planet, 2024). To address this, the National Sports Development Fund allocated ₹150 crore in 2024 for sports science and athlete support; however, uptake remains limited. A national survey found that 61% of athletes face barriers to adopting sports science, citing inadequate infrastructure (35%), high technology costs (24%), and shortages of trained sports scientists (22%) (IISM World Survey, 2025). Athlete awareness remains a critical constraint: 70% of athletes reported limited understanding of sports science benefits for performance, injury prevention, and recovery. While technology adoption is increasing 32% using smart watches and 23% fitness trackers usage is largely confined to elite cohorts with institutional backing (IISM World Survey, 2025). Sports science integration among elite athletes in cricket, hockey, and athletics rose from 30% in 2020 to 70% in 2024, yet grassroots programmes continue to rely on traditional coaching, reinforcing a two-tier development structure (The Sportz Planet, 2024).

Human resource constraints further compound these gaps. India's coach-to-athlete ratio of 1:114 is far below the international benchmark of 1:10, driven by low remuneration (₹15,000–₹40,000 per month), weak career pathways, and limited continuous professional development, despite formal certification programmes (Sports Authority of India, 2024; IOSR Journals, 2024). Compared to countries such as the USA and China where sports science and analytics are embedded across collegiate and provincial systems India's sports science capacity remains concentrated at National Centres of Excellence, with limited penetration at state and district levels (Ridpath et al., 2019; Tan et al., 2008).

2.3. International Comparison: Global University Sports Training Ecosystems and Infrastructure Models

Global university sports infrastructure models offer distinct integration pathways that India can selectively adapt. In the United States, the NCAA system spans 1,100+ institutions, operating standardized facilities that integrate training centres, sports medicine clinics, biomechanics labs, nutrition and psychology services, supported by dedicated sport science staff. This decentralised yet regulated model enables institutional-level talent development while maintaining competitive balance through enforceable standards (NCAA, 2024; Pierce, 2025). China follows a centralised pyramid model, where provincial sports institutes conduct early talent identification and universities function as advanced concentration nodes. Mandated facility standards support systematic data archiving, evidence-based coaching, and longitudinal performance tracking, allowing resource allocation toward athletes with the highest medal potential

(Tan et al., 2008). Australia and the United Kingdom emphasise coordinated support over heavy infrastructure. Through UniSport, EAEN, and BUCS frameworks, universities prioritise academic flexibility, integrated support teams, and targeted facility access. These models demonstrate that human capital, data continuity, and institutional coordination can substitute for large-scale infrastructure expansion (Ridpath et al., 2019; UniSport Australia, 2025).

2.4. Utilization Inefficiencies and Maintenance Challenges

India's infrastructure utilization rates reveal critical inefficiencies: Khelo India audit findings indicate that fund utilization in athletics remains below 50% despite budget allocation, reflecting administrative delays, inadequate equipment stocks, and insufficient trained personnel to fully activate available facilities (Sports Authority of India, 2024). Many newly constructed complexes experience underutilization immediately post-commissioning due to absence of trained coaching staff to manage facilities; lack of athlete identification and recruitment mechanisms to populate programs; insufficient operating budgets for equipment maintenance and utilities; and state-level administrative capacity constraints limiting effective facility management (Grant Thornton Bharat, 2024). Maintenance cost burden frequently exceeds initial construction investment over facility lifecycles: international synthetic athletic tracks require resurfacing every 8–10 years (cost ₹5–15 crore per facility), yet many state sports authorities lack dedicated maintenance budgets, resulting in facility degradation that renders them unsafe or ineffective within 5–7 years of commissioning (KPMG, 2024).

2.5. Why Infrastructure Alone Does Not Translate Into Performance



The fundamental distinction between infrastructure capacity and athletic capability illuminates a critical flaw in India's historical approach to sports development: the assumption that facility investment automatically generates athlete performance. International evidence contradicts this assumption: the USA achieves Olympic success not primarily through facility density but through systematic athlete identification, sustained coaching development, sports science integration, and financial support mechanisms enabling fulltime athlete development (National Collegiate Athletic Association, 2024). Australia's relative success (despite lower facility investment than the USA) derives from coordinated institutional support and specialized coaching rather than facility magnificence. China's systematic approach depends on data-driven talent identification algorithms applied across provincial systems, not facility abundance.

India's infrastructure gaps require remediation, but facility expansion absent simultaneous reforms in coaching quality, sports science integration, athlete support systems, and institutional coordination will perpetuate the cycle of "built infrastructure, underutilized capacity." The critical inflection point involves transforming infrastructure from passive facilities into active ecosystems: integrating sports scientists into daily athlete development, establishing peer mentorship systems connecting elite to emerging athletes, implementing systematic athlete health monitoring, and creating transparent performance feedback mechanisms that translate facility access into measurable athlete development outcomes.



03

Education, Skills, and the Sports Labor Market

3

Education, Skills, and the Sports Labor Market

3.1. Employment Opportunities in Sports: Coaching, Sports Science, Management, and Analytics

India's sports sector presents expanding employment opportunities across multiple professional domains beyond athlete performance. Union Budget allocations and National Sports Policy 2025 projections estimate the creation of 10.5 million sports-related jobs by 2030, alongside ₹21 billion in annual indirect tax revenue. Employment pathways span sports coaching; sports science fields such as physiology, biomechanics, psychology, nutrition, and physiotherapy; sports management covering events, facilities, federations, and sponsorships; sports analytics; sports media and content creation; event management; and wellness and fitness instruction. Coaching constitutes the largest employment segment but faces a severe workforce deficit. The Sports Authority of India reports a coach-to-athlete ratio of 1:114, far below the internationally recommended 1:10, implying a shortfall of nearly 300,000 coaches. Coaching roles exist across government sports authorities (₹18,000–₹35,000/month), national federations (₹20,000–₹50,000/month), private academies (₹15,000–₹60,000/month), and educational institutions. However, opaque promotion systems often tied to athlete results or federation politics limit career progression and discourage talent entry. Sports science roles are growing, supported by a ₹150 crore allocation in 2024 for capacity building. Yet hiring lags demand: in 2023, only 208 of 1,071 ministry recruitments (19.4%) targeted sports science graduates. Sports management has expanded through franchise leagues such as the IPL, Pro Kabaddi League, and ISL, offering higher private-sector compensation. Sports analytics remains an emerging high-growth area, with rising international demand but limited dedicated academic programs in Indian universities.

3.2. Pay Structures, Income Stability, and Resource Availability in India

Compensation structures for sports professionals in India remain significantly below international benchmarks, creating persistent challenges in talent attraction and retention. Coaching salaries in government institutions, including the Sports Authority of India and state sports authorities, typically range between ₹15,000 and ₹40,000 per month, well below comparable technical roles in education or public administration. Private sports academies offer relatively higher pay (₹18,000–₹60,000 per month) but provide limited job security, no pension benefits, and opaque career progression frameworks. National sports federations occupy an intermediate space, offering coaching salaries of ₹20,000–₹50,000 per month, with greater stability than private academies but continued uncertainty around contract renewals and advancement criteria. Sports science professionals including physiotherapists and performance specialists earn approximately ₹20,000–₹75,000 per month depending on qualifications and institutional affiliation. However, institutional absorption remains weak: the Sports Authority of India employs only 50-100 sports science professionals nationwide, a number insufficient to operationalize the ₹150+ crore sports science technology initiative launched in 2024. Employment insecurity further undermines workforce stability, as many coaching roles operate on annual contracts tied to athlete performance outcomes. The absence of portable benefits such as pensions and transferable health insurance exacerbates precarity. In contrast, U.S. NCAA coaching systems provide institutional pensions, health coverage, and defined advancement pathways. Finally, professional development remains constrained: limited capacity in national coaching certifications produces only hundreds annually despite shortages of thousands, while restricted access to international exposure limits long-term career mobility.

3.3. Skill Gaps between Indian Graduates and International Standards

Indian sports education graduates face significant skill gaps relative to international standards, undermining competitiveness in global labor markets and constraining domestic elite athlete development. A comparative analysis of Indian sports science and coaching curricula versus international programs (NCAA, Australian universities, European sports universities) reveals systematic gaps:

Coaching Education Gaps:

- Indian Diploma in Coaching: Strong theoretical foundation in exercise physiology, biomechanics fundamentals, but limited practical exposure to sport-specific applied coaching methodologies
- International (NCAA/BUCS) programs: Integrate 400+ hours supervised coaching practice, performance video analysis, athlete communication, and psychological support competencies largely absent from Indian curricula
- Sports science integration: Indian coaching curricula incorporate basic sports science concepts; international curricula systematize daily integration of performance analytics, injury prevention protocols, and evidence-based training design into coaching practice
- Pedagogical methodologies: Indian programs emphasize knowledge transmission; international programs emphasize athlete-centered learning, communication skills, and adaptive coaching approaches for diverse athlete populations

Sports Science Gaps:

- Indian sports science graduates: Trained in foundational exercise physiology and biomechanics but often lack experience with cutting-edge technology (motion capture analysis, force plate biomechanics, real-time performance monitoring systems)
- International standards: Assume proficiency with sport-specific performance analytics, research design and statistical analysis, and integration of data-driven insights into coaching recommendations skills frequently absent from Indian graduates
- Research methodology: International sports science professionals conduct independent research; Indian systems feature minimal research requirement in standard curricula, limiting critical thinking and innovation capacity

Data Analytics & Technology Integration:

- Indian programs: Limited coverage of performance analytics, video analysis software, or sport-specific technology applications
- International standard: Extensive training in performance analysis software (Dartfish, Kinexon, etc.), statistical software (R, Python, SPSS), and interpretation of complex performance datasets

The Ministry of Youth Affairs and Sports' 2024 assessment of coaching standards affirmed that Indian sports coaching standards are "being aligned with global best practices through international collaborations, sports science integration, and global representation and training" (Government of India, 2024). However, implementation remains partial: international coaching exchange programs remain limited, and most Indian coaches lack meaningful international exposure before advancing to senior positions.

3.4. Why Students Pursue Sports Education Abroad: Academic Quality, Infrastructure, and Career Outcomes

India's growing outbound migration in sports education reflects rational responses to persistent quality, infrastructure, and career-outcome gaps. A 2025 NITI Aayog report highlights a stark imbalance in student mobility: **India exports tens of times more students than it attracts**, underscoring systemic weaknesses in the country's higher-education attractiveness. In contrast, U.S. NCAA universities offer globally recognized curricula, integration with professional leagues, and research access; Australian institutions emphasize world-class coaching, sports science, and dual-career support; and UK universities foreground research-led sports science with academic career pathways. Infrastructure differentials further drive migration. NCAA, Australian, and UK universities routinely provide advanced facilities biomechanics labs, sports medicine clinics, psychology services, and performance analysis whereas Indian students often graduate without systematic exposure to athlete testing, video analytics, or research-active environments, despite recent improvements via Khelo India Centres and KISCEs. Career outcomes are decisive: 60–70% of NCAA student-athletes transition into sports-sector roles, while Indian graduates face bottlenecks in limited federation or government positions. Financial incentives amplify the pull, with scholarships valued at \$20,000–\$50,000 annually in the U.S. and \$15,000–\$25,000 in Australia, compared to scarce and competitive Indian support. Consequently, 15–20% of India's elite sports science and coaching graduates study abroad, and many do not return representing a significant loss of skilled human capital and innovation capacity.

3.5. Implications for Brain Drain and Domestic Capacity Building

India's outbound student migration in sports education reflects and perpetuates systemic capacity gaps. The NITI Aayog 2025 report quantified the broader brain drain phenomenon: 1.335 million Indian students were studying abroad in 2024, representing 95% growth since 2016, with remittances totalling ₹29,000 crore annually for education abroad (equivalent to 53% of India's total higher education budget) (The Print, 2025; NITI Aayog, 2025).

This outflow carries specific implications for India's sports sector:

1
Loss of Trained Talent: Estimated 500–1,000 sports education graduates annually pursue overseas education; retention rate post-graduation estimates 30–40%, indicating permanent loss of 600–700 annually trained human capital to global markets (NITI Aayog, 2025). This exodus directly undermines university sports capacity building: positions requiring sports science expertise, advanced coaching, and athlete support remain unfilled domestically.

2
Remittance Burden: While individual outflows represent individual choice maximization, aggregate remittance burden (₹29,000 crore annually) represents capital flight that could be invested domestically in university sports infrastructure, coaching development, and sports science capacity if India offered internationally competitive education (NITI Aayog, 2025).

3
Diminished Research Ecosystem: Outmigration of sports science and coaching professionals reduces India's capacity for independent sports research, innovation in athlete development methodologies, and evidence generation tailored to Indian population characteristics and socioeconomic constraints. This research deficit perpetuates dependency on international methodologies developed for populations (genetic backgrounds, altitude adaptation, socioeconomic resources) not necessarily aligned with Indian contexts.

Delayed Institutional Quality Improvement: The exit of capable individuals to global opportunities reduces pressure on domestic institutions to improve academic quality, equipment standards, and research capability. Conversely, competitive retention pressure in globally competitive labor markets drives institutional improvement: fear of talent loss incentivizes quality enhancement.

Domestic Capacity Constraints: The absence of critical mass of internationally trained sports professionals constrains elite athlete development: universities lack coaches schooled in cutting-edge methodologies; sports science teams lack exposure to advanced diagnostics and technology platforms; federation personnel lack international best-practice knowledge all undermining competitive capacity.

Addressing brain drain requires simultaneous improvements across multiple dimensions: institutional quality enhancement to match international standards, employment compensation competitiveness enabling career sustainability, research infrastructure supporting original innovation, and career progression clarity differentiating sports from alternatives. NEP 2020 and NSP 2025 create policy frameworks potentially enabling these improvements; however, implementation remains conditional on sustained resource allocation, institutional autonomy from political interference, and merit-based advancement mechanisms.





04

Integrating Sports with Education and Healthcare

4

Integrating Sports with Education and Healthcare

4.1. Sports and Physical Education in NEP 2020 and National Sports Policy 2025

The National Education Policy 2020 and National Sports Policy 2025 represent transformative policy frameworks conceptually integrating sports into India's educational and development architecture. NEP 2020 explicitly identifies physical education as essential component of holistic education, equivalent in importance to reading and numerical literacy (Government of India, 2020). The policy mandates: integration of sports and physical activities into classroom practices; incorporation of physical education as compulsory element (not co-curricular addition) across all grade levels; infrastructure development to support diverse physical activities; and specialized teacher training programs for physical education instructors (IJCRT, 2024; Physical Education Journal, 2025).

NEP 2020's approach emphasizes multidisciplinary learning wherein sports serve simultaneously as: academic discipline with theoretical foundations in exercise physiology, biomechanics, and sports psychology; practical skill development pathway; mental health support mechanism; and character-building vehicle teaching teamwork, discipline, and resilience (IJCRT, 2024). The policy calls for flexible curricula accommodating athletes: modified curricula for physically/visually challenged students; integrated learning approaches combining sports with science, mathematics, and social studies; and indigenous sports promotion (Kho-kho, Kabaddi, wrestling traditions) alongside modern sports.

The National Sports Policy 2025, approved by the Union Cabinet in June 2025, explicitly anchors one of its five foundational pillars on "Integration with Education (NEP 2020)," aiming to create seamless school-university- federation-professional sports pathways (Government of India, 2025). NSP 2025 calls for: formalization of school sports competitions' linkage to university and elite pathways; development of athlete support systems accommodating academic requirements; and institutional mechanisms ensuring athlete career development extends beyond sports participation (Government of India, 2025).



4.2. Integration of Sports with Formal Education Pathways: School to University

Structural integration of sport within India’s formal education system remains fragmented, with schools, universities, and federations operating as parallel rather than sequential pathways. At the grassroots level, the Khelo India School Games function as a national talent-identification platform, with over 30 million students theoretically eligible. In practice, participation is concentrated in urban schools and better-funded states, limiting the breadth of talent discovery. The transition from school to university sport is the weakest link in this pathway. While schools identify talent through inter-school competitions, progression into university programmes is largely informal, inconsistent, and institution dependent. The Khelo India University Games 2025 featuring 5,000+ athletes, 200+ universities, and 23 sports represent the apex of university competition, yet operate independently of the school sports pipeline. Participation is driven more by institutional selection than by transparent progression from school-level performance. Reports of low participation in certain KIUG events indicate inadequate school-to-university talent flow. Strengthening this continuum requires formal linkage mechanisms: automatic progression of school-level performers into university trials, reserved university sports seats for proven school athletes, academic flexibility during transition, and coordinated federation oversight to channel university talent into national development systems.



4.3. Linkages between Sports, Physical Health, and Preventive Healthcare

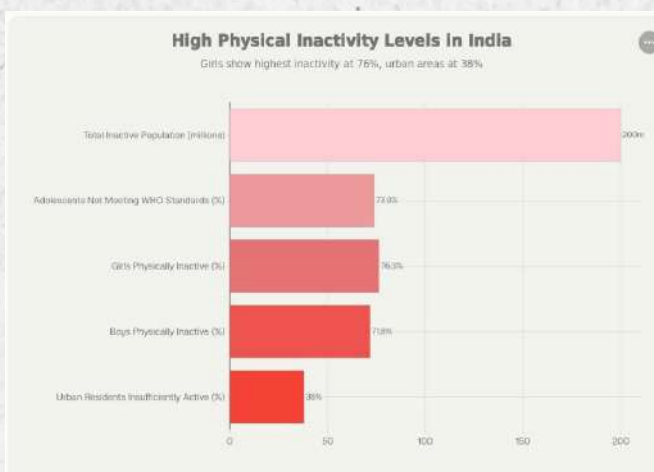


Figure: Physical Inactivity Crisis in India: Key Indicators

India confronts a preventive healthcare crisis wherein physical inactivity directly drives non-communicable disease (NCD) epidemic. Over 200 million Indians fail to meet WHO physical activity recommendations (less than 150 minutes weekly for adults; less than 420 minutes for children), creating 1.5–2.0x disease burden relative to active populations (The Sports Society of India, 2022).

The public health impact of physical inactivity in India is substantial and measurable. Projections indicate that achieving universal population-level physical activity by 2047 could prevent approximately 110 million non-communicable disease cases including cardiovascular disease, diabetes, cancer, and obesity yielding ₹29 - 30 trillion in healthcare savings, or about 0.6% of annual GDP.

The crisis is most acute among adolescents: 73.9% fail to meet WHO activity norms, with higher inactivity among girls (76.3%) than boys (71.8%), reinforcing life-course risks of adult inactivity, obesity, and early NCD onset. Urban areas exhibit paradoxically higher inactivity (38% insufficiently active) despite infrastructure availability, driven by sedentary work, automobile dependence, and digital leisure. Rural populations remain more active overall but lack structured opportunities and facility access. Recognizing sport as preventive healthcare, NSP 2025 prioritizes “Sports as People’s Movement,” complemented by the Fit India

Movement to promote accessible, everyday physical activity. Universities thus hold a dual mandate: fostering campus-wide fitness participation while sustaining elite sport, mirroring international models that integrate recreational activity with high-performance pathways.

4.4. University and School-Level Ecosystem Design

Effective integration of sports into education systems requires institutional ecosystem design encompassing: infrastructure coordination, human resource development, governance clarification, and financing mechanisms.

Infrastructure Design:

- Schools: Minimum standards mandate playgrounds, athletics tracks, indoor sports facilities proportional to student enrolment; currently, 35–40% of Indian schools lack adequate sports infrastructure
- Universities: Campus infrastructure should accommodate both elite athletes (world-class training facilities) and mass participation (recreational sports facilities accessible to all students)
- Inter-institutional coordination: School and university facilities should coordinate scheduling and shared access, optimizing infrastructure utilization efficiency

Human Resource Development:

- Physical education teachers: NEP 2020 mandates specialized PE teacher training; current shortage estimated at 200,000+ qualified PE instructors nationally
- University sports administrators: Require training in athlete support systems, academic integration, and dual-career management
- Coaches: Systematic development programs linking school, university, and federation coaching pathways with defined advancement criteria and international exposure requirements

Governance Clarification:

- AIU role: Should formalize as apex university sports authority, overseeing KIUG, setting institutional standards, and coordinating university-federation alignment
- State Olympic Associations: Should coordinate school and university sports at state level, ensuring resource distribution equity
- National federations: Should establish explicit partnerships with university systems, designating universities as development nodes rather than competing entities

Financing Mechanisms:

- School sports: Government allocation currently approximately 2–3% of education budget; NEP 2020 target calls for 5% minimum allocation
- University sports: Institutional autonomy in sports financing varies; leading institutions (Chandigarh University example) demonstrate that internal budget prioritization yields medal outcomes
- Dedicated sports university funding: Consider establishing sports development fund earmarked for university infrastructure, athlete support, and coaching development with transparent allocation criteria



05

Data deficit in Indian sports

5.1. Current state of sports data in India: availability and fragmentation

India's sports system generates diverse data across athlete registration and demographics, participation and competition records, performance and training metrics, health and injury information, coaching and workforce deployment, institutional infrastructure, and public funding utilization. However, this data is captured unevenly, stored in silos, and governed through fragmented institutional arrangements, resulting in limited continuity across an athlete's developmental pathway. While centrally supported environments such as Sports Authority of India (SAI) centers, national training camps, and select national sports federations maintain partial digital records, large segments of school-, university-, and state-level sport continue to rely on non-standardized or manual systems (MYAS, 2021; SAI, 2023). Recognizing these limitations, the Government of India, under the Khelo India programme, proposed the National Sports Repository System (NSRS) to create a unified digital backbone for athlete, coach, and institutional data (PIB, 2021).

The proposal itself reflects an explicit policy acknowledgement that existing arrangements do not enable longitudinal tracking of participation, performance, health outcomes, human resources, or infrastructure utilization. In practice, data collection remains institution-centric rather than system-oriented, with limited interoperability across federations, universities, SAI centers, and state departments. This fragmentation constrains evidence-based planning, weakens accountability, and restricts the effective use of analytics and artificial intelligence in sports governance (NITI Aayog, 2021; MYAS, 2025).

5.2. Absence of national data standards and interoperable systems and its consequences

The absence of nationally defined data standards and interoperable systems represents a critical structural weakness in India's sports system. Currently, institutions collect athlete, performance, health, workforce, and infrastructure data using heterogeneous definitions, formats, and identifiers, making meaningful aggregation or comparison difficult. There is no universally adopted athlete identifier, common performance taxonomy, or standard protocol for recording injuries, workloads, or competition exposure, resulting in datasets that remain non-comparable across institutions and jurisdictions (MYAS, 2021; NITI Aayog, 2021). This lack of interoperability has direct operational and policy consequences. Athlete progression from schools and universities to elite pathways cannot be tracked reliably, selection decisions remain largely subjective, and injury prevention systems operate without longitudinal health histories.

From a governance perspective, the absence of standardized data weakens transparency and accountability, limiting the ability to link public funding with outcomes or evaluate institutional performance (MYAS, 2025). It also constrains workforce planning by obscuring demand–supply mismatches in coaching, sports science, and allied roles. Furthermore, fragmented and non-standardized datasets significantly inhibit the responsible deployment of analytics and artificial intelligence, as advanced tools require consistent, high-quality, interoperable inputs to generate reliable insights (MeitY, 2021). In effect, without national data standards, digital initiatives remain isolated pilots rather than scalable system-level reforms.

5.3. Global practices in sports data management

Globally, high-performing sports systems treat data as a core public infrastructure, governed through clear standards, centralized oversight, and interoperable platforms. In countries such as the United States, the United Kingdom, and Australia, athlete data covering participation, performance, health, and education is captured through standardized protocols and linked via persistent identifiers, enabling longitudinal tracking across institutions and competition levels (OECD, 2019; UK Sport, 2022). University-led systems such as the NCAA integrate academic records, competition exposure, medical data, and compliance requirements within unified data environments, supporting transparent eligibility management and evidence-based performance planning (NCAA, 2023). At the elite level, national sports agencies operate centralized analytics units that aggregate data from decentralized training environments, ensuring consistency while preserving institutional autonomy. These systems place strong emphasis on data governance, athlete consent, and independent audits, recognizing that trust and interoperability are prerequisites for the effective use of analytics and artificial intelligence (Australian Institute of Sport, 2020; OECD, 2021). International experience demonstrates that standardization and interoperability precede technological sophistication, not the reverse.

5.4. Need for centralized analytics with decentralized data collection

Given India's scale and institutional diversity, effective sports governance requires a centralized analytics layer supported by decentralized data collection. International experience shows that decentralized capture at schools, universities, academies, and training centres ensures coverage and contextual accuracy, while centralized analytics enables standardization, validation, benchmarking, and policy learning (OECD, 2021; Australian Institute of Sport, 2020). Without such separation, data either remains fragmented or becomes administratively burdensome. A centrally governed analytics architecture allows governments to generate system-wide insights on performance pathways, injury risks, workforce gaps, and infrastructure utilization, while preserving institutional autonomy. This model provides the necessary foundation for scalable policy implementation, accountability, and responsible use of analytics and AI.

A large stadium at night, illuminated with vibrant blue lights. The stadium is filled with spectators, and a fireworks display is visible in the sky above the field. The scene is framed by a white border.

06

Role of Technology and Data Science in Sports Development

6

Role of Technology and Data Science in Sports Development

6.1. Linkage between data science and sports: global evidence

Globally, data science has emerged as a core enabler of systematic sports development, reshaping how talent is identified, and performance is optimized, and athlete welfare is protected. High-performing sporting systems increasingly rely on integrated datasets spanning participation histories, competition exposure, biomechanical and physiological indicators, injury profiles, and training loads to inform evidence-based decision-making. Empirical studies demonstrate that data-driven approaches improve athlete progression accuracy, reduce injury incidence, and enhance resource efficiency when embedded within structured institutional frameworks (OECD, 2019; McKinsey & Company, 2020). Leading universities exemplify how data science and sport intersect in practice. At Stanford University (USA), collaboration between computer science, statistics, and kinesiology produces predictive models for performance and injury risk. Loughborough University (UK) is internationally recognized for its Sports Technology Institute and data analytics research linked to elite sport. These institutions show that the value of data science lies not in standalone tools, but in standardized data capture, robust governance, and domain-specific interpretation. Where these foundations exist, data science becomes a force multiplier for policy, coaching quality, and institutional accountability rather than a mere technological add-on.

6.2. Adoption of sports technology and AI in India: current practices and application areas

In India, the adoption of sports technology and data-driven tools has accelerated over the past decade, primarily within centrally supported high-performance programmes and select professional sports environments. Institutions such as the Sports Authority of India (SAI) and initiatives under the Khelo India programme have introduced athlete monitoring systems, basic performance analytics, and digital athlete registries, particularly at national training centers and competitions (MYAS, 2021; SAI, 2023). National federations in select sports most notably athletics, wrestling, shooting, and cricket have begun using video analysis, wearable-derived workload metrics, and competition analytics to support talent identification and elite preparation. These tools are increasingly applied to identify high-potential athletes, monitor training loads, assess technique, and reduce injury risk through early detection of fatigue and overuse patterns (BCCI, 2022; SAI, 2023).

However, adoption remains uneven and concentrated, with limited penetration at the university and state levels. Most applications operate as isolated tools rather than integrated decision-support systems, constrained by fragmented data, skill gaps among coaches, and the absence of common standards. As a result, while technology has demonstrated value across talent identification, injury management, and performance optimization, its impact remains localized rather than systemic (MYAS, 2025; NITI Aayog, 2021).

SPORTS ANALYTICS EVOLUTION TIMELINE



Source: Sports Evolution Timeline



07

Institutional Architecture: The Hub-and-Spoke Model

7

Institutional Architecture: The Hub-and-Spoke Model

7.1. Rationale for hub-and-spoke systems in large, federated countries

In large, federated countries with diverse institutional capacities and geographic dispersion, hub-and-spoke systems are widely adopted to balance central coordination with decentralized delivery. Under this model, a limited number of high-capacity institutions (“hubs”) are responsible for standard-setting, analytics, validation, and knowledge generation, while a broad network of delivery units (“spokes”) focus on execution, participation, and contextual implementation. International experience across public systems demonstrates that such architectures reduce duplication, improve consistency, and enable scale without requiring uniform institutional capacity across all regions (OECD, 2021).

In the context of sports development, hub-and-spoke models allow centralized oversight of data standards, performance benchmarks, and athlete welfare, while permitting schools, universities, academies, and states to operate within their local constraints. This design is particularly relevant where resources, coaching quality, and infrastructure vary significantly, as it enables system-level intelligence and accountability without excessive centralization (Australian Institute of Sport, 2020).

7.2. Defining hubs: sports universities, NIS Patiala, and Centers of Excellence

In the Indian sports system, hubs should be limited to high-capacity national and regional institutions with the mandate and capability to set standards and generate system-wide intelligence. These include the National Sports University, designated state sports universities, and the Netaji Subhas National Institute of Sports, along with select Sports Authority of India (SAI) National and State Centers of Excellence. These hubs are responsible for analytics, validation, benchmarking, coach education, and high-performance oversight.

7.3. Defining spokes: schools, colleges, academies, and states

Spokes comprise the broad delivery network of schools, general and affiliated universities, physical education colleges, private and public sports academies, Khelo India centers, and state sports departments. These institutions focus on participation, training, competition exposure, and primary data capture within their local contexts. Under a hub-and-spoke architecture, spokes generate standardized inputs and implement guidance, without being required to build high-end analytical or validation capacity.



7.4. Role of NIS Patiala as national validation and deployment authority

Within a hub-and-spoke architecture, the Netaji Subhas National Institute of Sports (NIS Patiala) should function as India's national validation and deployment authority for sports technology and AI, rather than as a mass education institution. Its role is central to ensuring credibility, safety, and consistency across the system. AI integration within this model operates across distinct layers:

- **Data validation layer:** standardizing performance, health, and workload data received from hubs and spokes.
- **Analytics and model-testing layer:** validating AI models for talent identification, injury prediction, and performance optimization.
- **Coach decision-support layer:** translating analytical outputs into interpretable guidance for elite coaches and federations.
- **Certification and governance layer:** approving tools for national use and conducting periodic audits for bias, accuracy, and ethical compliance.

This layered approach ensures AI is deployed responsibly, consistently, and at scale.

7.5. Evidence, precedents, and applicability to India

Internationally, hub-and-spoke architectures underpin national sports systems led by institutions such as the Australian Institute of Sport, where centralized analytics and standards support decentralized training environments. OECD governance frameworks similarly endorse this model for large, federated public systems. In India, comparable networked structures already operate through the Sports Authority of India and Khelo India centers, demonstrating administrative feasibility. Formalizing this approach would consolidate existing practices into coherent, scalable national sports development architecture.



08

Key Gaps and Constraints Identified



8

Key Gaps and Constraints Identified

The diagnostic assessment of India's university sports ecosystem reveals five interconnected systemic gaps that constrain both participation expansion and elite athlete development. These gaps operate simultaneously across data systems, human capital, physical infrastructure, institutional coordination, and financial incentives creating a self-reinforcing constraint on sports system performance.

8.1. Data and Information Gaps

India's sports ecosystem generates extensive data across athlete registration, competitions, performance, health, coaching deployment, and infrastructure usage, yet this information remains fragmented across non-interoperable systems managed by schools, universities, state departments, federations, and the Sports Authority of India. The absence of standardized identifiers, taxonomies, and protocols produces three major systemic failures.

First, athlete progression cannot be reliably tracked across educational and competitive transitions. Performance histories, injury records, and development data are lost as athletes move from school to university and federation pathways, leading to duplicated talent identification and missed advancement opportunities. The KIUG 2025 illustrates this gap: despite 5,000 participants, no standardized mechanism links university athletes to national development pipelines.

Second, fragmented data constrains analytics and AI adoption. Although India's sports analytics market is projected to grow from USD 75.2 million in 2024 to USD 290.1 million by 2030 (24.2% CAGR), applications remain confined to elite cricket and select federations. Grassroots athletes lack access to data-driven performance tools, while 70% of athletes report limited awareness of sports science benefits.

Third, policy decision-making suffers. With no unified performance or demand-supply data, allocation of ₹1,000 crore under Khelo India relies on historical precedent rather than evidence. The proposed National Sports Repository System can address these gaps, but only if uniform data standards and mandatory adoption are enforced across institutions.

8.2. Skills and Employability Gaps

India's sports sector exhibits a sharp skills and employability paradox: industry revenues are growing at 15% annually, triple the global average of 5%, yet sports employment accounts for only 0.5% of national employment, compared to 2–4% globally. This reflects a structural mismatch between education output and labor market absorption. Coaching highlights this imbalance. India operates at a 1:14 coach-to-athlete ratio, below the recommended 1:10, implying a shortage of nearly 300,000 coaches. However, compensation remains unattractive: government roles pay ₹15,000 - 40,000 per month, federation roles ₹20,000 - 50,000, and private academies ₹18,000 - 60,000 with limited security or benefits deterring qualified professionals.

Sports management shows even starker misalignment. Over 70 institutions produce hundreds of graduates annually, yet only 8.25% secure roles aligned with qualifications. Job searches rose 11% while postings declined 25%, with 59% of jobs concentrated in three states. Women comprise <30% of full-time sports employment, far below international benchmarks. Sports science capacity is similarly constrained: only 50–100 professionals are employed nationally, despite a ₹150 crore investment, leaving 61% of athletes unable to integrate sports science into training. Closing these gaps requires credential standardization, competitive pay, portable benefits, clear career pathways, and institutionalized education employment linkages.

8.3. Infrastructure and Quality Gaps

India's sports infrastructure has expanded rapidly—1,045 Khelo India Centres, 34 State Centres of Excellence, 306 accredited academies, and 326 projects worth ₹3,124.12 crore yet persistent quality and utilization gaps limit impact. Facilities remain geographically concentrated in select hubs such as Ahmedabad, Bhubaneswar, Chennai, and Delhi, while regional and rural infrastructure is underutilized. International evidence shows that performance outcomes depend not on facility quantity but on integration with coaching quality, sports science, and athlete support systems. The U.S. model demonstrates this through standardized requirements linking facilities with biomechanics labs, sports medicine, nutrition, psychology, and analytics.

India exhibits a two-tier system: district-level centres report only 20% access to sports science, compared to 60% at national centres. Only 21 of 36 states possess international-standard athletic tracks, constraining technical development. Fund utilization further reflects inefficiencies, with Khelo India athletics spending below 50% despite allocations. Maintenance is a critical weakness: synthetic tracks require resurfacing every 8 - 10 years at ₹5–15 crore, yet most states lack dedicated maintenance budgets, causing premature degradation. Training quality compounds these gaps: the 1:14 coach-to-athlete ratio exceeds standards, and coaching and sports science curricula lack the extensive supervised practice and advanced technology exposure common internationally. Closing these gaps requires targeted regional investment, mandated maintenance funding, and integrated capacity development transforming facilities into functional athlete development ecosystems.

8.4. Governance and Coordination Gaps

India's sports ecosystem is governed by 10+ national, state, and district-level bodies including the Ministry of Youth Affairs and Sports, SAI, AIU, SGFI, IOA, 58 National Sports Federations, and state/district authorities without clearly defined coordination or role delineation. This fragmentation leads to duplicated efforts, inefficient resource use, and weak accountability. University sports highlight these failures. Although the Association of Indian Universities (AIU) has coordinated university competitions since 2008, it operates parallel to federations rather than within an integrated pathway. As a result, transitions of elite university athletes into federation systems are informal and inconsistent. Administrative lapses at the 2025 World University Games, where six badminton players were barred due to incorrect submissions, exposed governance capacity gaps and prompted reconsideration of AIU's role. The dual governance structure autonomous federations alongside government bodies further entrenches silos, duplicating talent identification across schools, universities, and federations. Health data integration is also absent; injury and medical histories do not transfer across institutions, increasing athlete risk. The National Sports Governance Act 2025 introduces statutory reforms term limits, athlete representation, mandatory committees, and a National Sports Tribunal but implementation remains constrained by funding dependence, limited athlete voice, and uneven state capacity. Effective coordination requires institutionalized data-sharing, standardized talent pathways, and digital athlete tracking across the ecosystem.

8.5. Financial and Incentive Misalignment

Despite rising allocations, India's sports sector remains structurally underfunded. The Union Budget 2025–26 allocated ₹3,794 crore to sports a 130.9% increase since 2014–15 yet this accounts for <0.08% of the total Union Budget, far below the 1–2% seen in sports-driven economies. Private investment in sports infrastructure remains

<20%, compared to 60–70% internationally. Consequently, sports contribute only 0.1% to GDP and 0.5% to employment, versus 0.5% GDP and 2–4% employment globally. Compensation misalignment drives talent away. Coaching roles pay ₹15,000–40,000 (government), ₹20,000–50,000 (federations), and ₹18,000–60,000 (private academies) often without job security or benefits. Sports science roles pay ₹20,000–75,000, but availability is limited, with only 50–100 professionals employed nationally by SAI. Annual contracts tied to athlete performance, lack of portable benefits, and weak career progression further deter retention. These financial disincentives fuel outward mobility: 15–20% of elite sports graduate study abroad, with 600–700 professionals lost annually. Addressing misalignment requires competitive salary floors, long-term contracts, portable benefits, transparent career pathways, and insulated institutional funding for sports.



09

**Policy
implementation**



The National Sports Policy 2025 and complementary governance reforms establish comprehensive frameworks addressing identified gaps through seven integrated policy implementation domains linking directly to systemic constraints. These implementation mechanisms translate policy vision into operational capacity across data systems, education, employment, infrastructure, healthcare integration, talent retention, and institutional coordination (Government of India, 2025).

9.1. National Sports Data and Analytics Framework

The National Sports Repository System (NSRS) establishes a centralized data-governance framework with decentralized data collection across schools, universities, academies, and training centres. It requires standardized data protocols, persistent athlete identifiers for longitudinal tracking, and interoperable digital platforms. Data standardization covers five domains: athlete registration, performance metrics with international benchmarks, health and injury records, coaching and sports science credentials, and infrastructure utilization analytics. Implementation should follow a phased timeline pilot rollout within 6 - 12 months, national scaling over 12 - 24 months, and a unified athlete database by 2027. A centralized analytics unit at NIS Patiala will handle validation, AI model development, coach decision support, and ethical oversight, while data collection remains decentralized mirroring proven Australian and UK sports intelligence architectures.

Data standardization must address five categorical domains

1. Athlete registration and demographic data capturing age, gender, socioeconomic background, state of origin, school/university affiliation, and competitive level.
2. Performance and competition data standardizing sport-specific metrics (times, distances, scores) with international benchmarking capability, competition exposure documentation, and medal/ranking progression.
3. Health and injury data recording injury classification, occurrence dates, recovery timelines, return-to-play protocols, and longitudinal health monitoring enabling early injury risk detection.
4. Coaching and sports science personnel documenting credentials, qualifications, certification status, institutional affiliation, and continuing professional development participation.
5. Infrastructure utilization metrics tracking facility bookings, athlete usage patterns, maintenance activities, and cost-per-use analysis enabling efficiency assessment (Khelo India Scheme, 2025).

The analytics layer operates through a centralized unit established within National Institute of Sports (NIS) Patiala, functioning as India's national validation and deployment authority for sports technology and artificial intelligence (National Institute of Sports, 2025). This centralized analytics unit executes four critical functions: (1) Data validation and standardization, ensuring consistent formatting, accuracy verification, and outlier detection across decentralized sources; (2) Analytics and model development, creating sport-specific algorithms for talent identification, injury prediction, and performance optimization tested against historical data and peer-reviewed methodologies; (3) Coach decision-support translation, converting analytical outputs into interpretable guidance for elite coaches and federation staff avoiding algorithmic opacity; and (4) Governance and ethics auditing, conducting periodic assessments for algorithmic bias, accuracy drift, and ethical compliance ensuring responsible AI deployment (Ministry of Youth Affairs and Sports, 2025).

9.2. Reforming Sports Education and University Capacity in India

The National Sports University (Imphal, Manipur) established 2018 serves as the apex institution for sports education, offering specialized degrees integrated with research in sports science, coaching, and athlete development (Ministry of Youth Affairs and Sports, 2025). However, university sports education capacity requires expansion across geographic distribution and curriculum alignment with international standards and Indian contextual requirements.

University sports education reform has three core implementation dimensions:

(a) Institutional network expansion:

Designate 50 state and central universities as sports education hubs with dedicated sports science labs, biomechanical testing facilities, research infrastructure, and specialized faculty. This hub-based model reduces geographic access gaps while concentrating resources in capable institutions, as evidenced by Chandigarh University's KIUG 2025 success, demonstrating returns on targeted campus investment.

(b) Curriculum standardization and benchmarking:

Align Indian sports education with global standards in research methods, advanced analytics, sports technology, athlete-centred coaching, interdisciplinary support, and ethics, while integrating India-specific modules such as altitude physiology, tropical climate adaptation, and culturally responsive athlete support. Curricula should be accredited by the proposed National Council for Sports Education & Capacity Building (NCSECB), with mandatory quality reviews and international faculty exposure.

(c) Dual-career support infrastructure:

Integrate academics and elite sport within universities through flexible examination schedules, distance learning options, academic advisors, and mental-health support as drawing from successful Australian university models. The Khelo India Scheme should fund dual-career systems in designated sports education hubs.

9.3. Incentivizing careers in the sports sector requires four aligned interventions:

(a) Salary scale adjustment and formalization:

Align sports compensation with comparable technical professions. Entry-level government coaching roles should pay ₹30,000–40,000/month, rising to ₹50,000–70,000 for senior coaches. Sports science professionals should earn ₹35,000–75,000, supported by 3–5 year contracts instead of annual renewals to ensure job security.

(b) Portable benefits and financial security:

Introduce portable pension contributions (≈15% of salary) across institutions, comprehensive health and disability insurance (including family cover), and ₹20,000–40,000 annual CPD budgets for skill upgrading and international exposure.

(c) Transparent career progression frameworks:

Establish clear, merit-based promotion ladders (Assistant Coach → Coach → Senior/National Coach → Head Coach), with advancement tied to performance outcomes, qualifications, appraisals, and tenure—replicable across sports science, management, and federation roles.

(d) Ecosystem and industry development:

Allow federations to allocate 10% of funding for manpower and 2.5% for specialists, expand PPP and CSR incentives for infrastructure, and integrate the ₹1.3–3.4 lakh crore sports-tech sector into Khelo India for job creation in analytics and performance technology.

9.4. Aligning Infrastructure Investment with Utilization and Outcomes

The Khelo India Scheme aligns infrastructure investment with utilization and performance outcomes through multi-tiered planning, monitoring, and accountability mechanisms. State Level Planning and Monitoring Committees (SLPMC) oversee execution, financial progress, and quality compliance, using quarterly reviews to track construction status, facility commissioning, maintenance planning, and outcome indicators such as athlete usage, training exposure, and event hosting. District Level Planning and Monitoring Committees (DLPMC) manage ground-level implementation, monitor construction quality, ensure community accessibility, and support athlete recruitment to ensure post-commissioning utilization. External oversight is provided by State Level Monitors and optional Third-Party Quality Assurance (TPQA) agencies, which independently assess progress, quality standards, and implementation bottlenecks. Infrastructure assets are digitally tracked through GIS/GPS-based systems, assigning each facility a unique identifier to monitor construction, maintenance, utilization, and outcomes. Annual joint inspections by state authorities and MYAS/SAI verify on-ground conditions using mobile-based reporting tools. Sustainability is ensured through mandatory maintenance action plans at commissioning, including 8–10% annual maintenance budgets, preventive maintenance schedules, and qualified service providers. Outcome monitoring shifts focus beyond construction to athlete impact tracking facility usage, coaching and sports science deployment, competition hosting, and athlete progression ensuring infrastructure investment translates into measurable development and public benefit.

9.5. Integrating Sports, Education, and Healthcare Systems

Sports system integration with formal education and healthcare represents critical policy priority enabling synchronized development across participation, talent identification, athlete health, and workforce qualification (National Sports Policy, 2025).

School-to-university talent pathways formalization requires explicit institutional linkage mechanisms replacing informal transfer processes. Khelo India School Games (30 million eligible students nationally) serves as grassroots talent identification source; transparent advancement mechanisms should translate school competition performance into university sports opportunities. Specific mechanisms include:

1. School competition standardization establishing consistent participation, performance, and advancement criteria across states ensuring comparable athlete identification.
2. University athletic scholarships reserved for school competition winners and documented high-potential athletes, with transparent selection criteria and award schedules.
3. Athlete transfer protocols documenting athlete progression from school to university enabling institutional recognition and support continuity.
4. (4) Federation coordination ensuring university programs systematically feed emerging talent into national development systems without bureaucratic barriers (National Sports Policy, 2025).

Effective implementation requires clear institutional roles and healthcare integration. State education departments should oversee school sports standards; a restructured Association of Indian Universities should regulate university competitions and scholarships; national federations must formalize recruitment and talent integration; and the Sports Authority of India should validate data standards to enable seamless athlete tracking. Healthcare integration should include systematic athlete health screening, shared electronic health records, standardized injury-prevention protocols, and a national athlete health registry supporting long-term monitoring. The Ministry of Youth Affairs and Sports should set policy and funding frameworks, with universities providing athlete support and dual-career pathways. Quarterly multi-stakeholder coordination meetings are essential to ensure accountability, compliance, and aligned implementation across the sports-education-health ecosystem.

9.6. Retaining Talent and Reducing Outbound Migration

India's outbound migration in sports education stems from persistent gaps in institutional quality, career clarity, and financial competitiveness. Retention requires elevating domestic sports universities into credible global alternatives. Priority actions include strengthening research infrastructure to generate India-specific sports science knowledge, an area where Indian athletes remain underrepresented in global datasets. Universities should establish focused research centres in altitude training physiology, tropical climate adaptation, nutrition aligned to Indian diets, and biomechanics of indigenous sports such as kabaddi, kho-kho, and wrestling. This would reposition Indian institutions as global knowledge producers rather than consumers.

International collaboration is essential to accelerate quality improvement. Structured partnerships with leading US NCAA, Australian, and UK universities should support faculty exchange, joint research, student mobility, and collaborative degree programs. Hosting international faculty for extended tenures can rapidly upgrade curriculum depth and research culture. Retention also depends on employment competitiveness. Implementing structured salary scales, benefits, and clear career pathways alongside adjacent opportunities in sports business, technology, fitness, and tourism can broaden outcomes for graduates. Finally, targeted repatriation incentives, including reserved government roles, research leadership positions, federation appointments, and startup support for sports-tech entrepreneurs, can attract internationally trained Indians back into India's sports ecosystem.

From Fragmented Structures to Coordinated Frameworks

India's sports advancement hinges on transitioning away from disconnected, event-centered facility development toward a cohesive framework encompassing educational institutions, athletic bodies, sport federations, and specialized training hubs. Historical precedent shows that constructing facilities divorced from qualified instruction, evidence-based sports medicine, participant support systems, and sequential skill-building produces modest sustainable outcomes. Lasting competitive standing necessitates embedding Athlete Development Pathways across all organizational levels, maintaining progression from community-level participation through championship-level athletics.

Leveraging Major Competitions as Structural Drivers Rather Than Terminal Goals

The Commonwealth Games 2030 and prospective Olympics 2036 should function as structural levers to drive institutional reform rather than symbolic endpoints. Hosting requirements can solidify university-federation partnerships, strengthen KIUG's competitive standing, establish coaching as a professionalized vocation, and create reliable athlete support mechanisms. A 12-year competition cycle permits systematic talent cultivation, converting early talent identification into sustained medal-winning capacity rather than isolated performance spikes.

Information Systems as Organizational Intelligence

A comprehensive National Sports Repository serves as the backbone for policy anchored in verifiable evidence. Unified athlete tracking codes, synchronized technological infrastructure, and consolidated data analytics headquartered at NIS Patiala facilitate continuous athlete monitoring, prevention of injury, confirmation of emerging talent, assessment of facility efficiency, and forecasting of human resource needs. Critically, this infrastructure must foster domestic research capacity, positioning India to build context-specific scientific approaches suited to its demographic and environmental conditions rather than wholesale adoption of external frameworks.

Institutional Alignment and Mandate Definition

While the National Sports Governance Act 2025 provides legal structure, practical success demands genuine operational cooperation. Transparent assignment of responsibilities among MYAS, SAI, AIU, sporting associations, and regional authorities as reinforced through regular collaborative meetings, standardized selection protocols, digital information systems, and performance-contingent allocations remains essential. A distributed architectural model featuring centralized strategy alongside regional implementation preserves institutional independence while guaranteeing unified direction.

Human Capital as the Critical Constraint

Ceiling on elite achievement reflects personnel scarcity, not facility shortage. Closing gaps in coaching expertise, sports medicine specialists, and administrative talent mandates attractive compensation structures, multi-year employment security, transferable compensation packages, and transparent advancement criteria. NCSECB-supported standardization of educational content must guarantee international recognition of credentials while cultivating specialization in high-altitude conditioning, adaptation to hot climates, and regional sports methodologies positioning India as both a developer and retainer of world-class professionals.

Economic Sustainability and Growth Potential

Despite expanding market value, sports remain economically underdeveloped within India's broader economy. Strategic application of collaborative public-private infrastructure models, advancement of sports-technology ventures, growth of athletic tourism, and expansion of local sports equipment production can strengthen sports' contribution to national output and work creation. Diversifying capital sources beyond state funding proves essential for operational resilience and research-led advancement.

Geographic Distribution and Equitable Access

Present athletic development concentrates in metropolitan regions, overlooking considerable untapped potential. Strategically positioned university athletic centers and state-level Khelo India facilities require corresponding investment in trained personnel, operational competency, and foundational physical education curricula. Buildings alone, absent qualified staff and quality oversight, will entrench rather than reduce inequality.

Women's Involvement and Social Inclusion

Participation among female athletes stays below 30%, with steeper rural-urban gaps. National Sports Policy 2025 mandates must materialize as proportionate financial aid, expanded female coaching positions, participation in leadership structures, and secure athletic facilities. Broader inclusion spanning persons with disabilities, economically disadvantaged populations, marginalized communities, and tribal groups requires targeted budgeting, specialized infrastructure, and systematic performance assessment.

Academic Advancement and Indigenous Knowledge Development

Dependence on external sports science research constrains relevance to India's circumstances. Strengthening scientific investigation capacity within athletic universities, coordinated by NIS Patiala, encompassing high-altitude physiology, heat acclimatization science, nutritional optimization, and regional movement analysis is fundamental. Persistent investment, qualified scientific personnel, and collaborative research facilities position India as a contributor to international sports knowledge.

Implementation Across Educational and Competitive Pathways: Essential Next Steps

Strategic direction is established; operational delivery becomes paramount. The Commonwealth Games 2030 creates temporal urgency to embed permanent modifications across information infrastructure, institutional frameworks, staffing capacity, and participant assistance. Converting these competitions into vehicles for enduring systemic enhancement rather than temporary ceremonial events permits India to establish lasting competitive excellence, broadened athletic participation, and measurable economic contribution by 2036.

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